Railway World ANNUAL

1979

Edited by G. Freeman Allen

£2.95

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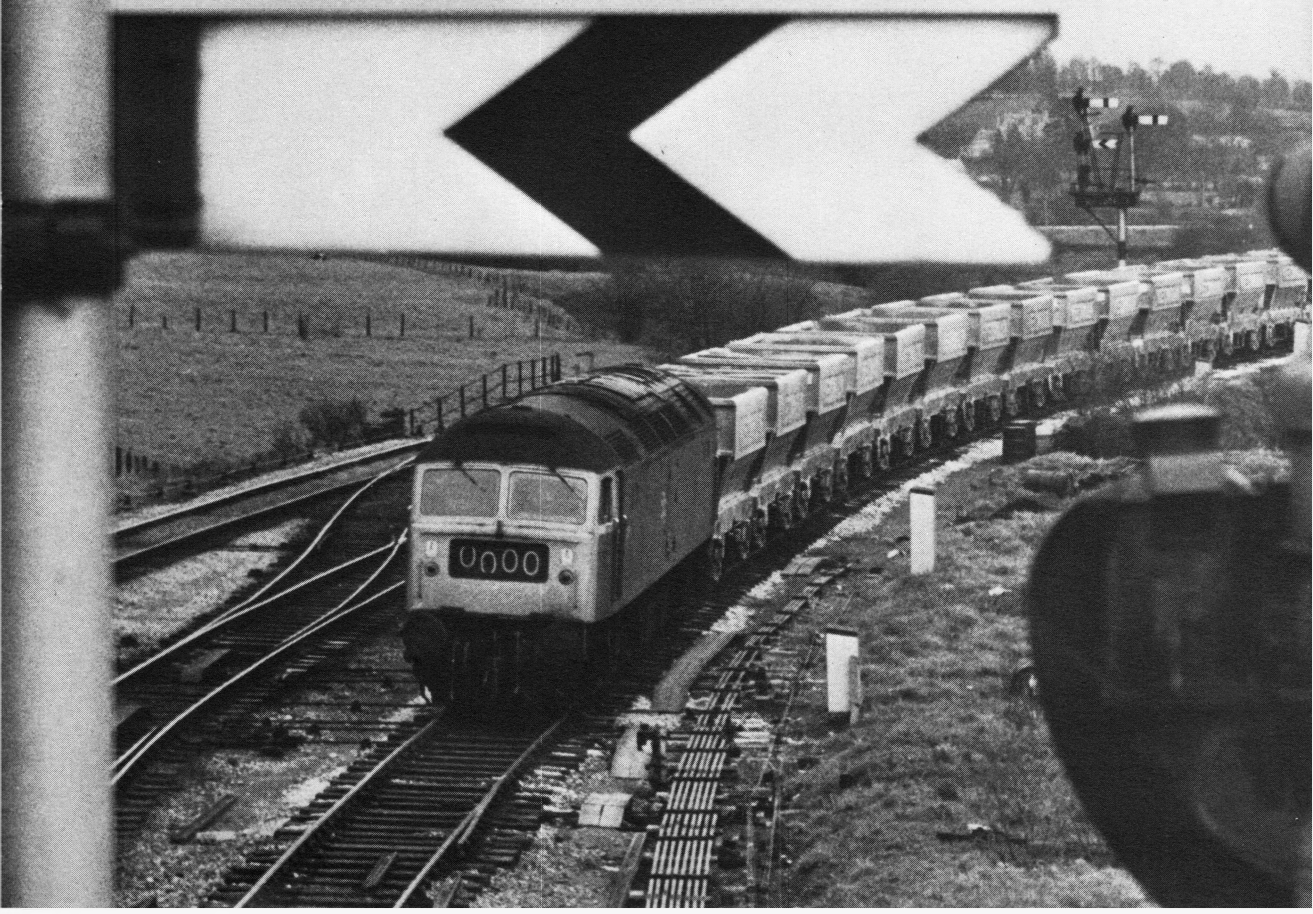
LONDON

IAN ALLAN LTD

Title page: *Westbury on 1 April 1976, looking east from the station: the 08.56 Portsmouth Harbour-Bristol dmu approaches, passing Class 47 diesel No 47.235 waiting for the road at the head of a Yeomans stone train.* / Philip D. Hawkins



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Cover: *Stanier Black Five No 5231 leaves Quorn with a Main Line Steam Trust working to Rothley in 1977.* / Joe Rajczonek

Front endpaper: *Class 47 diesel No 47.245 heads oil tanks past Newport Ebbw Junction towards Port Talbot on 15 January 1976. Awaiting calls to duty on the left are a Class 37, another Class 47, the erstwhile Brush 2,800hp prototype No 1200* Falcon *and a Class 25.* / Philip D. Hawkins

This picture: *Class 7 Pacific No 70038,* formerly Robin Hood, *climbs between Oxenholme and Low Gill with a morning Crewe-Carlisle parcels on 19 July 1967.* / J. Clarke

First published 1978

ISBN 0 7110 0861 2

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Published by Ian Allan Ltd, Shepperton, Surrey, and printed in the United Kingdom by Ian Allan Printing Ltd

Britain's first inter-city electrics

The Southern's third-rail drive to the South Coast

B. K. COOPER

A map of electrified lines in England in 1930 would have shown several small, detached clusters widely scattered over the country north of the Thames, and a coherent network south of the river. The Southern Railway had just completed a programme which enabled it to claim 'the world's greatest suburban electrification' comprising 875 track-miles. In the course of the work the electrification of the Brighton main lines as far as Coulsdon, which had been carried out in 1925 on the ac overhead system of the former LBSCR, was converted to the Southern's standard 660V dc.

Coulsdon is only 36 miles from Brighton. The LBSCR had toyed with the idea of electrifying its main line right through to the coast. Not surprisingly the Southern soon had the same end in view.

An announcement that electrification was to be extended from Coulsdon to Brighton and Worthing was made by the Chairman, Brigadier-General the Hon Everard Baring, at the Annual General Meeting of the Southern Railway Company on 27 February 1930. The Chairman explained to shareholders that they had decided to complete the electrification of the London suburban area first. After lengthy consideration, the same voltage had been adopted for the extension to Brighton and Worthing as 'by this means', he said, 'we can bring our suburban trains into use for excursion and weekend traffic and thus save a very large sum in the construction of vehicles'. It was also decided that multiple-unit sets would be more appropriate than locomotive-hauled trains for the type of service it was proposed to run — 'in other words', the Chairman added, 'we are treating this phase of our electrification rather as an extension of suburban electrification than as a main-line electrification.'

These views cannot have been flattering to ardent admirers of the London, Brighton & South Coast Railway, but it was the voice of Waterloo speaking. South Western officials in the area of Clapham Junction had been known to depreciate their neighbour as 'the Hornby railway next door'. The SR Publicity Department did not worry about such niceties and as soon as the first section was opened a poster appeared headed 'Main Line Electrification to Brighton and Worthing'.

None the less, although Brighton had assumed various images in the popular mind since Dr Russell had extolled the virtues of sea bathing there in the late 18th Century, a London suburb was not one of them. The Southern shareholder who, in congratulating the Board on its decision, observed that London already stretched to Redhill, and that Brighton was advancing rapidly north of Preston Park to meet it, was simply indulging in rhetoric appropriate to an annual general meeting. To the press, publicity departments and the public this was to be a main-line electrification, and the first of its kind in the country in spite of occasional murmers about Liverpool-Southport from the LMS. After Redhill the tidy back gardens and toolsheds, the school playgrounds and parks receded and the line headed for the hills and woods which once had been the dark forest lands of Sussex. Beyond Balcombe and the Weald lay the South Downs, and then the brief sparkle of the sea glimpsed at the end of the valley where the coast line from the east came in on its curving viaduct.

The decade of the Brighton electrification was the decade of the free electron. Electric currents were no longer confined to copper conductors. They could flow in the form of a stream of electrons given off from an incandescent spot on a pool of mercury. This was the basic mechanism of the mercury-arc rectifier, a device first used for traction supplies in this country at the Hendon substation of London Transport in 1930. All the substations feeding direct current to the trains on the Brighton electrification south of Coulsdon were equipped with mercury-arc rectifiers. Up to then rotary converters had been used, with substation attendants — a minimum of seven men for a pair of substations — to supervise the security of the supply and the running of the machines. In the Brighton scheme there were 18 substations, all unattended and controlled remotely from the control room at Three Bridges.

Three Bridges control room, windowless and with its diagram covering the walls, was an unsuspected forecast of the claustrophobic operations rooms of World War II. In its day it was considered a wonder and it was visited by the Prince of Wales (later King Edward VIII) in company with the Crown Prince of Sweden, for a Swedish company had provided the equipment. The size of the control panel at Three Bridges — very large by present standards for the area controlled — was governed by the size of the switches which had to be mounted on it in their correct geographical positions on the system diagram, to control the remote switchgear. Two switches were provided at every position, one to select the distant circuit-breaker and the other to open or close it. Post-

war remote supervisory controls on the Southern were able to shrink the size of panel dramatically by using miniature telephone type key switches and other apparatus.

The rectifier installations for the Brighton line included pumps to maintain the vacuum inside the tanks, and to circulate cooling water. The pumpless, air-cooled rectifier did not arrive until later, the pioneer again being London Transport in an installation at Putney Bridge substation in 1936. The power supply and control arrangements for the Brighton electrification were forerunners in a line of development which was to earn dc systems a leading place in long-distance main-line electrifications at higher voltages, and make the choice between dc and industrial-frequency ac in later years very finely balanced.

At the same time that substation buildings and track sectioning cabins were appearing along the lineside to Brighton and Worthing, semaphore signals were being replaced by three-aspect colour-lights. When this resignalling had been completed in the autumn of 1932, the 36 miles from Coulsdon North to Brighton formed the longest continuous stretch of colour-light signalling in the country.

Signalboxes were equipped with miniature levers, electrically locked and operating circuit controllers through which connections were made to the signals and point machines. The Southern remained faithful to the miniature lever power frame until 1956, when a relay interlocking with control switches was put in experimentally at Keymer Crossing. The general adoption in the Southern Region of relay interlockings with control switches on a console or on the panels did not begin until 1959, first in a new box at Barnes and then throughout major schemes for resignalling in the London area and for the Kent Coast electrification.

Three types of train were provided for the new services. The basic express unit, of which 20 were built, was a six-coach set with two open third motorcoaches, three side corridor coaches and a Pullman car. There was no corridor connection between units, but since there was a Pullman car in each, refreshments could be served to all passengers.

Above: *A 5-PUL emu photographed near Merstham before World War II.* / O. J. Morris

Above right: *The multiple-unit 'Brighton Belle', formed of two 5-BEL emus; this post-World War II view was taken on 19 April 1952 at Balham Intermediate box.* / E. R. Wethersett/Ian Allan Library

Right: *Interior views of a 'Brighton Belle' emu as built: on the left a third-class car, on the right the first-class car* Vera.

Three 'City Limited' units were similar except for a higher proportion of first-class seating. Each express motorcoach was powered by four 225hp motors.

Semi-fast services were worked by four-coach units of compartment stock, one composite vehicle per unit having a side corridor. Visitors to the Southern familiar with railways north of London thought the isolated corridor coach in these sets a curious arrangement, but travellers with memories of the LBSCR probably considered the provision of one corridor coach in four almost lavish. There were seats for five a side in the non-corridor third-class compartments, and folding arm-rests enabled passengers to divide themselves into groups of two, one and two if so minded. Each motorcoach was powered by two motors of 275hp.

The Pullman Car Company provided 23 composite cars for the express sets and three five-car sets for the 'Southern Belle' (as it continued to be called at first). 'Belle' sets consisted of three third-class and two first-class cars. They were the first electric multiple-unit Pullmans in the world and presented the anomaly of belonging to the Pullman Car Company but being operated by Southern Railway drivers and guards and containing SR traction equipment in the third-class motorcoaches. The ventilation system was advanced for its day, air being distributed through ducts and heated as necessary under thermostatic control. Incoming air was monitored by a light beam focused on to a photo-electric cell. If smoke was drawn in, as might occur when the 'Belle' passed less sophisticated trains in tunnels, a solenoid valve was operated which diverted air into a by-pass duct and out through a roof ventilator.

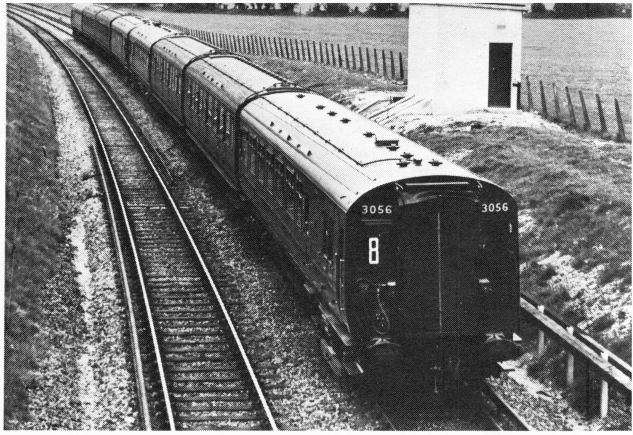
All traction motors for the new trains were totally enclosed, being cooled by natural air flow over the outside of their frames. This meant heavy frames to dissipate the heat but kept dust and dirt out of the machines. The Southern continued using totally enclosed motors until lightweight machines were introduced in 1947. A comparison of weights is interesting. The standard totally enclosed express motor weighed 3.38tons as against the 1.92tons of the lightweight motor. Totally-enclosed motors soldiered on in the 'Brighton Belle' sets until the last runs on 30 April 1972. They had needed no major attention except rewinding, and because of the power-weight ratio of the 'Belle' sets were able to match the performance of the post-war express stock.

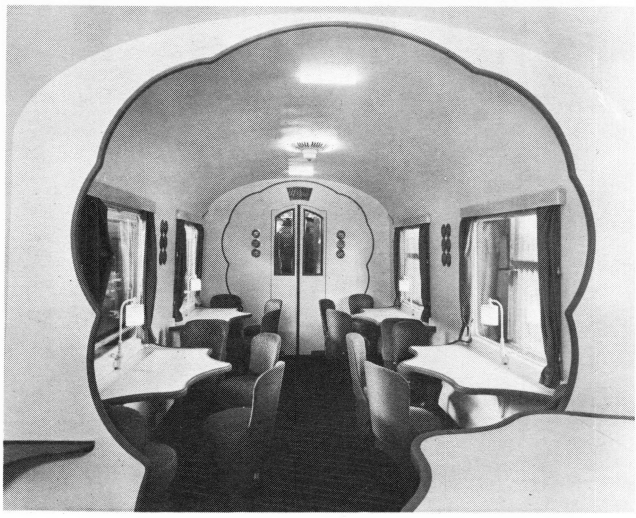
The formal inauguration of the electrification on 30 December 1932 was an occasion. At Victoria the Lord Mayor of London arrived with liveried coachmen and footmen, and attended by the Sword-Bearer, to join the inaugural train. This was formed of a '6-City' unit. Leaving at 11.12, it ran direct to Worthing via the Cliftonville curve, arriving at 12.26. The guests then travelled to Brighton where luncheon was served in the Royal Pavilion. Proposing the toast of 'The electrification of the Southern Railway to Brighton', the Lord Mayor reminded the gathering that they were living in a wonderful age which in little more than 50 years had seen inventions ranging from electric light to the motorcar, the aeroplane, and wireless. Since science knew no last word, the steam train might be a museum piece in a few years time, he thought.

Among those digesting this prophecy with their lunch was the representative of the *Brighton Herald*, who had made the journey from London. His approval of the proceedings was whole-hearted. Perhaps the special train had not attracted as much attention from busy Londonders as he could have wished on pulling out of Victoria, but on home ground all was triumph. Between Brighton and Worthing heads appeared at every window, handkerchiefs were waved, 'and everywhere people were running up to level crossings and other points of observation to see the new electric train go by'. The reporter found the electric train 'in every way an improvement on the steam-driven train. Both inside and out the coaches are far pleasanter to the eye... the steam trains by comparison seem clumsy, over-elaborate, dull. The electric train is bright. It has a sense of lightness and neat simplicity. It has got rid of the heavy appearance of the steam train as it has got rid of the smoke and fire and the loud puffing'.

But there was a reservation behind the euphoria.

'It would be untrue to say that all noise and all oscillation were banished', this candid but tactful commentator continued. 'The true version is that the oscillation was gentler, more even. The noise was similarly softened. It was more akin to the rushing of the wind than to the old "bump and clank" '.





Top: *'Nelson' in action — an eight-coach formation of two 4-COR emus caught near Petersfield in the opening years of the Portsmouth electrification, 1937.*

Above: *The florid decor of one of Bulleid's buffet cars in a 4-BUF emu for the Mid-Sussex electrification.*

The reporter had also sampled the Pullman and was no less impressed. 'In the steam-driven Pullmans', he wrote, 'one was housed like a rich man. In these electric Pullmans one is indulged like a princess in a fairy tale. The only drawback one can conceive... is that people will find them so luxuriously comfortable that at the end of the journey they will decline to get out'.

The last steam-hauled 'Southern Belle' arrived in Brighton in the afternoon of 31 December 1932, appropriately headed by 4-6-4T No 333 *Remembrance*, and 'the very last steam-hauled train' was the 00.05 from Victoria, arriving in the small hours of New Year's Day behind No 329 *Stephenson*, of the same class. Then the main-line part of the

station 'awoke to find itself "all-electric" and the centre of such curiosity as has not been witnessed for years.' The first electric 'Southern Belle' arrived bringing with it 'a distinguished company of Southern Railway officials', both train and passengers receiving an enthusiastic welcome from the crowds at the station. Also on board was the London Madrigal Group who had given a recital during the journey to demonstrate that the exceptionally quiet running of the stock made such a concert possible on a railway train for the first time.

A few days later the railway received a tribute from the Bench. Mr J. D. Cassels, MP, JP, presiding over the court of Quarter Sessions in Brighton 'amid all the solemnities of wig and gown', sought leave to congratulate 'this ever-advancing borough upon the introduction of a service of electric trains between the greatest metropolis in the world and the best British coastal town'.

Soon, inevitably, came the criticisms. A story circulated in Hove to the effect that electrification had a disturbing effect on the projection of sound films at the Lido cinema adjoining the station. But the Manager of the Lido hastened to squash the rumour. 'We welcome the electrification of the line', he wrote, 'for not only will it bring more and more people to Hove but it will remove the nuisance of the "Puffing Billy". The one thing we have suffered from is the letting off of steam by engines standing in the siding just outside the cinema'.

Residents of Preston Park complained at having to go into Brighton to catch a fast train to London, but the Editor of the *Brighton Herald* had little patience with them and soon stopped the correspondence, observing that 'people who want fast trains to London from any point in the Brighton radius must go to Brighton Central for them'. He was equally brusque over criticisms of cheap fares, which some readers found irrational, but he sharply reminded them that such fares were 'worked out commercially, not mathematically'.

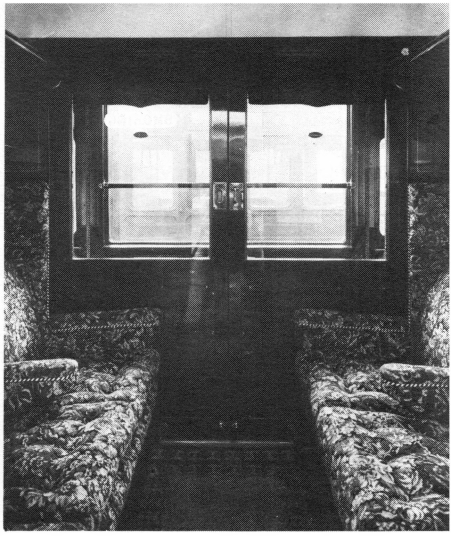
Some travellers were less satisfied than the *Herald* reporter with the amenities; one season ticket holder found them 'most disappointing'. The first-class corridor coaches, in his opinion, were so constructed that it was impossible to avoid a draught even with all windows and doors shut. In the steam trains it was possible to regulate the heat in a compartment, but there was no means of doing so in the electric trains, where one was either roasted or frozen according to the fancy of the train officials. He found the third-class compartments less draughty but the seats unsuitably dimensioned for persons of average size, while the jolting of the coach made reading difficult.

In the broader territories served by the Great Western, the LMS and the LNER the Brighton affair had remarkably little impact, although the flowering of the Brighton legend was observed with curiosity. At railway gatherings the Brighton enthusiast with glittering eye and the name 'Stroudley' on his lips was soon recognised, and avoiding action taken if necessary. Railways were still the backbone of the transport system and their business was to move their traffic in the most effective manner, not to provide entertainment for the onlookers or to serve as Adventure Playgrounds for the private owners of steam locomotives. Enthusiasts north of the Thames sympathised with their southern brethren who were seeing steam eroded on a significant scale for the first time, but they felt secure enough themselves to view the situation rationally.

Meanwhile the hoped-for increase in traffic on the Brighton main line was materialising in a manner encouraging to the Southern Railway Board. At the company's meeting on 1 March 1934 the Chairman reported that of an increase of £321,000 in passenger revenue in the preceding year, £150,000 was earned by the new electric services to Brighton and Worthing. They therefore felt fully justified in extending electrification to Seaford, Eastbourne and Hastings via Lewes.

The new work was on similar lines to the Brighton scheme although there were changes in rolling stock. This time 17 express six-car sets were built in which a first-class compartment coach with a pantry section took the place of a Pullman Car. Contemporary pictures and drawings in the technical press described the vehicle as a buffet car, but its catering opportunities were somewhat circumscribed. An electric water heater in the pantry enabled tea and coffee to be made, but there was little else. Folding tables could be fitted up in the compartments as required. It was, in fact, a coach with a pantry and the set in which it ran was a 6PAN as opposed to a 6PUL. Both varieties ran together on the Brighton and Eastbourne services. Now began that complicated Southern language of PULs, PANs, BILs, HALs, NOLs and so on, in which only those who have grown up in Southern territory can hope to become proficient. For semi-fast services there was a basic two-car units of two corridor coaches, not interconnected but affording access to toilet compartments for all, unlike the hit-and-miss Brighton semi-fasts, while the slow train unit was two non-corridor coaches.

Public services on the Eastbourne/Hastings scheme began on 7 July 1935. Criticisms of detail are inevitable in any new train service, but on the whole public reaction to these Southern main-line electrifications was favourable. No doubt they seemed in tune with an age in which it had been predicted that aeroplanes would soon be cruising at 200mph. A correspondent in the *Daily Express* wrote: 'I travelled



from Victoria to Lewes on three consecutive days recently. The trains were perfect; clean and prompt both ways; and there was a Pullman attached for light refreshments. It seems to me that electrification is the secret of the future of our railways, at any rate over short distances. A friend tells me that the Southern Railway's Brighton service is magnificent in every way'.

The Sussex resorts tended to be most favoured by Londoners and dwellers in the southern Home Counties. By the middle 1930s, too, private motoring was booming and they were becoming resorts for the weekend outing rather than the summer holiday. Not far away, however, was the Isle of Wight which drew visitors from further afield and was less conveniently accessible by car. The Portsmouth expresses from Waterloo in steam days were viewed with respect as boat trains of a sort. When it was learned that these were next on the Southern Railway's list for electrification, curiosity and even concern mounted as had not arisen before.

One feature announced for the new trains was hard to visualise. This was the corridor connection at both ends of a four-car express set, necessary to allow through communication from end-to-end of a 12-car train so that all passengers could reach the restaurant car or buffet. The idea of a train with a flexible proboscis at the front end like an ant-eater or baby elephant was not attractive. Yet these four-car sets for the Waterloo-Portsmouth electrification of 1937 were to become the beloved 4CORs, one of which has achieved the unexpected destiny of preservation and a ripe old age carrying steam enthusiasts on the Nene Valley Railway, hauled as like as not by a steam locomotive of Continental origin.

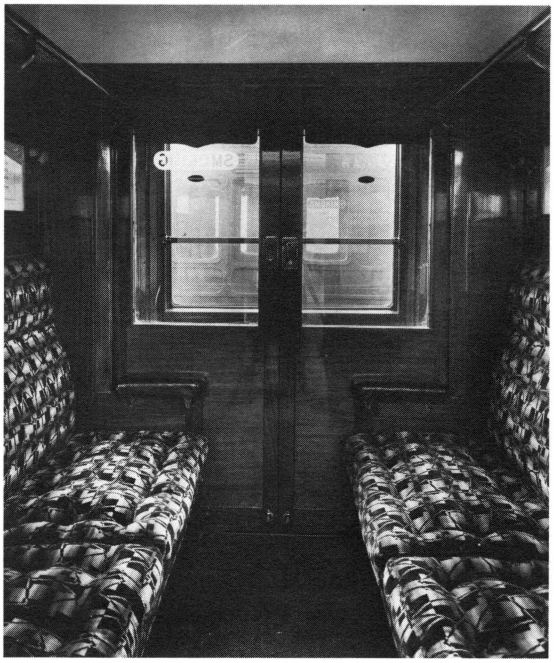
The Portsmouth expresses gave a full restaurant service, one unit in the train having a first-class restaurant car adjacent to a third class car with kitchen. This was recognisable as main-line catering

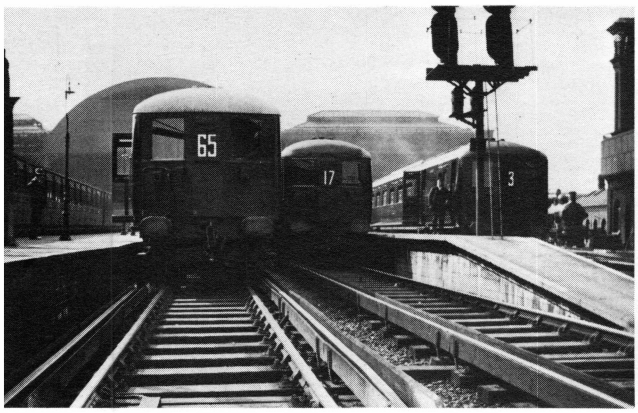
Above left: *An October 1968 shot of two 4-LAV semi-fast emus leaving Burgess Hill on a Victoria-Brighton stopping service.* / John A. M. Vaughan

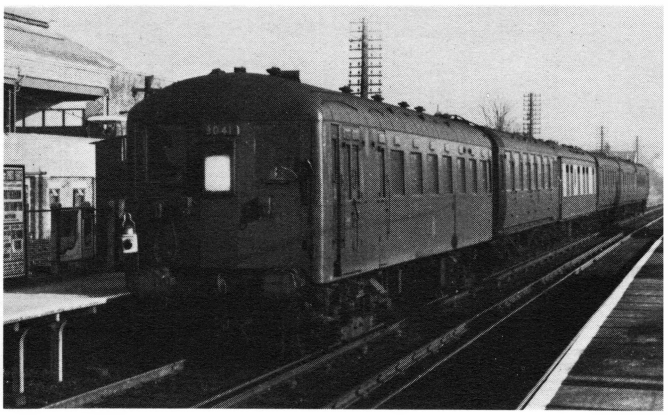
First-class (above) *and third-class* (below) *compartments in a 4-LAV emu as built for the Brighton electrification.*

Above right: *Line-up for the evening coastal exodus from London Bridge before World War II — the 17.00 to Brighton, 17.03 to Eastbourne and 17.06 to Worthing and Littlehampton.* / H. M. Madgwick

Above far right: *One of the straight-sided motor cars of the 6-CIT emus with extra first-class trailers, specially built for the onetime 'City Limited' of the Brighton line, brings up the rear of 6-PUL unit No 3041 passing Aldrington Halt on a post-World War II Littlehampton-Victoria service.* / P. J. Sharpe







comparable with the standards further north. The same could not be said of tea and biscuits from a pantry in a 6PAN bound for Eastbourne. On summer Saturdays three trains in each direction ran non-stop between Waterloo and Portsmouth Harbour, specifically for the Isle of Wight traffic. The traction motors in the express motorcoaches were similar in design to those of the Brighton and Eastbourne trains but were given a higher continuous rating for long non-stop runs at average speeds in the 50mph range, including five miles at 1 in 80 between Milford and Haslemere. The motor frames were finned to improve heat dissipation.

The sight of wobbling corridor connections at the front soon became familiar and the 4CORs were actually chosen as the subject of an OO gauge model by Trix. They acquired the nickname of 'Nelsons' reputedly because the motorcoach had only one 'eye', the driving compartment being to one side of the corridor connection. On the other side, in place of the offside window, was the route indicator ousted from its customary central position by the gangway. In those days one did not have to be a code expert to know where a train was going. The 4CORs carried roof boards. Brighton and Worthing trains had been similarly equipped at first, but the boards were abandoned when rolling stock rosters became more complicated.

Full public services on the 'Portsmouth Direct' route from Waterloo began on 10 July 1937. The Southern had already decided to electrify its route from Victoria to Portsmouth via Horsham and the Mid-Sussex line. This route had remained a pocket of steam operation from Victoria. The approaches from Dorking and from Three Bridges, and the Mid-Sussex line itself had retained a remarkable air of seclusion, a world away in atmosphere from the busy Brighton main line. There was no Crawley New Town in those days.

In such a setting it is not surprising that heads were shaken at the prospect of an electrified line through the countryside, and the Southern's Bill for the new work encountered opposition in Parliament. Fears were expressed for livestock, wild life, and incautious pedestrians taking traditional short cuts. At the Annual General Meeting in 1937 the Chairman outlined the precautions being taken, but added a warning invested with ingenious imagery. The public must realise, he said, that a railway line with its fast and increasing service of trains and with the additional danger of electric current differed little in negotiability from a fast-flowing, fordable river and should only be crossed where crossings were provided. The average healthy person coming in contact with the live rail would suffer no more than a 'sharp shock', but he admitted casualties among otters and badgers which had damp coats and apparently tried to get under rather than over the live rail.

So Portsmouth via Horsham went ahead, and with it the electrification of the coast line from West Worthing to Havant and its branches. Full public services began on 3 July 1938. The Bognor and Portsmouth steam trains were no more and with them went the Victoria-Littlehampton via Worthing trains, which had remained steam-hauled, for Worthing electrics of the original Brighton/Worthing scheme were now extended to Littlehampton. More 4CORs appeared, some with buffet cars of unusual design (4BUFs in the jargon). The tables under the windows were shaped with a series of concave curves where the stools were placed so that the seating did not obstruct the central gangway, and the bar counter had a similarly 'scalloped' edge. Similar curves were seen in the partition between bar and buffet sections, giving a somewhat oriental effect, although the inspiration is said to have come from the East via the contemporary picture palace. The wall opposite the bar had no windows 'to ensure greater privacy' for the sophisti-

The 'Brighton Belle' units at the end of their career, now in BR grey-and-blue livery, stored at Brighton and awaiting disposal on 5 June 1972. In the background a 4-COR wheels into the station from Ore. / J. Bradshaw

cated patrons would naturally not wish to be stared at while the train was in a station by backwoodsmen who had opposed the coming of the third rail.

But the oddest feature of the cars was the decoration with plaques representing 'food appropriate to be served in a buffet car'. The artist took a broad view in this matter. No Travellers Fare pork pie and fruit cake for him, but 'pork and apple sauce with, in the border, sausages and beans'; also beef and Yorkshire pudding with a surrounding motif of horseradish and oxtail soup. It is said that the original plan had been to show animals from which delicacies are derived, but it was discovered at a late hour that one of the beasts chosen had a special significance in an Eastern religion and the whole thing had to be hastily redesigned.

While these Central Section main-line electrifications had been in progress, the Eastern Section had been electrified to Sevenoaks on the main line to Dover at the beginning of 1935. The pre-war chapter closed with the Western Section's Reading electrification on 1 January 1939, and the Eastern Section electrification to the Medway towns on 2 July 1939. London-Rochester was literally 'inter-city' and so indeed was the second Portsmouth scheme with its electric trains between London and Chichester. The Medway electrification brought some changes in electrical practice. High-voltage circuit-breakers at substations were smaller because experience had shown that the volume of oil used for arc-quenching and insulation could be reduced. The rectifiers had control grids which suppressed 'backfires' without tripping the circuit-breakers and cutting off power. In the next six years there were technical developments in directions literally unknown in 1939, but it would be longer than that before they could be fed back into the railway industry.

The Southern's first main-line electrics gave railway travel a modern image in an area where much of the Edwardian had lingered around it. Frequency of service and standardised timetables as much as speed made them popular with travellers, who in increasing numbers followed the green and white 'Southern Electric' signs to stations they had little used for years.

But the emus were not great stirrers of the imagination. In 1935 an Essex vicar writing in his church magazine enquired 'who would care two hoots for the "Flying Scotsman" or the "Royal Scot" if they were all-electric?' He saw the demand for electrification as akin to the demand for a reformed calendar — 'part of the modern flight from romance'. For many years spotters at Watford Junction on Saturday mornings would reflect his sentiments as they shouted 'take your tram away' at the motormen of electrics blocking their view of the main line. Curiosity about the 'works' of an electric train was non-existent among them although most of them could have passed an examination on the basics of the reciprocating steam engine. The world of electrical designers had no identifiable personalities. Official technical descriptions of electric rolling stock tended to treat the traction equipment as an afterthought, something bought ready-made and connected up in the same way as the engineer today often buys an electronic system in a black box to run his plant for him. Few had seen a traction motor, and if they had it would not have impressed them for few machines look more inert when removed from their proper habitat. Perhaps if some inspired science master had taught Ohm's Law in terms of the accelerating current of the 'Brighton Belle' interest might have been kindled. It seems never to have been done.

The Maestro

A footnote to the history of Europe's post-war rail recovery

R. E. VINCENT

In September 1943, I was one of a small detachment of Railway Operating troops of the Royal Engineers at Metaponto, a small junction station on the badly battered Indian State Railways in Southern Italy — in the 'instep' to be more exact. This station boasted a useful yard, a small locomotive depot and a dormitory and it was the junction station between the coast line and the branch to Potenza and Naples. The locomotive allocation in those thin days was one '625' class 2-6-0, which functioned as a sort of main line pilot. Metaponto was mainly a crew change-over and lodging point, main line engines working through between Taranto and Sibari, the principal stations on either side.

Soon after our arrival, when military traffic up and down the line was running more or less smoothly, I decided it was time to try my hand at driving. Trespass on the inviolate footplate of the locomotive department was by no means easily committed, but two things were in my favour. In the first place I was in a favourable position to arrange it and, more important perhaps, Wally Williams, the NCO in charge of the locomotive side, was a useful man always prepared to have a go at anything unusual.

The first thing to do was to arrange an excuse for the journey. Any junketings on the main line would obviously have been most unwise but I suddenly recollected the presence of about 40 empty wagons at the first station down the Potenza branch, at a place called Bernardo. Orders were therefore given to the local Italian railway staff that, at 14.10 next day, engine 625 : 443 would proceed light to this station with a British crew to recover the empty wagons, returning as required. At the foot of the written order it was revealed that the driver's name would be Vincent and Williams the fireman.

It then transpired that this train would be the first to run on the Potenza branch since the latter days of August, when Allied aircraft had systematically paralysed the railway system prior to the invasion on 3 September. The branch was seriously damaged in a demolished tunnel far to the north so that no through traffic was running. Consequently the Italian staff treated this excursion as a small fiesta; in fact, it was rather like the 'last day' on an English branch in reverse. The engine, a good example of the numerous '625' class of 2-6-0 with Caprotti valve gear, was given an extra rub over for the occasion and was brought down to the station in good time on the appointed day by one of the shedmen.

At about 13.30 I climbed into the cab and glanced expertly at the gauges and fittings. Observing that steam was blowing from a joint on the air brake pump and obscuring the forward view, and secure in the knowledge that light engines always use the steam brake, I therefore turned the cock and stopped the pump. Now quite sure of myself, I opened the firebox door, cast a practised eye over the fire, and pronounced it to my satisfaction.

For this excursion I had booked on a carriage and wagon examiner and a shunter who would also act as guard on the return train journey. This made a reasonable party of four on the footplate, but the Italian staff had other ideas. They had also laid on a *capo treno* (guard) and three *frenatori* (brakesmen) to look after their interests. After a voluble ten minutes' argument with all concerned, we compromised by taking the *capo treno* and one brakesman. Then, at 14.15 the Station Master, an imposing 16stone character complete with red hat, emerged from his office and waved the little green bat.

Right away! A deft adjustment of the valve gear, a gentle opening of the regulator — and nothing happened.

'Give it a bit more', whispered the admirable Williams, while our four companions waited with baited breath for the *maestro* to do his stuff.

I did; and with surprising smoothness we were off. Pleased with the response of this unfamiliar piece of machinery I 'gave it even more' and quite quickly we hit the single branch lead and were soon galloping into the country at a cracking pace.

All too soon Bernardo distant signal came into sight and at caution too. So, taking a leaf from the books of all the best enginemen, I prepared to stop at the next signal. Since we were running slightly downhill, the regulator had been closed for some time, so I made a small movement of the brake handle expecting to feel a

distinct retarding as the shoes gripped the spinning wheels. But for the second time that day nothing happened and we continued to bowl merrily along through the clear air. Hopefully, I moved the brake lever further round but again there was nothing doing; it even seemed as if we were going faster than ever (which we probably were).

I glanced at the other occupants of the cab and saw three faces looking my way with eyebrows fast disappearing under their hat-brims. The two Italians were leaning out at the other side and appeared to be looking for something. Suddenly the *capo treno* took a deep breath and shouted out something that was almost unintelligible above the noise in the cab, but I did catch the words *'passagio livello!'* I duly looked out ahead and was just in time to see us pass the home signal at danger. There, too, about half a mile ahead on the straight, *was* a level crossing right enough: the barriers were across the line and the crossing keeper stood smartly at attention with his red flag held aloft like an Olympic torch.

In this moment of crisis I remember working out very coolly that at 60mph we should reach the crossing in rather less than half a minute if nothing was done about it. While I was thus engaged, Williams reached across and guided my hand (with the brake valve in it) to the emergency position. But instead of the expected jerk of iron biting into the tyres there was only the whistling of the wind as we sped along.

At this juncture Wally Williams spotted the turned-off air brake pump cock and with an appropriately pithy comment he wound it open and started to pump. And I was winding too; because does it not say in all the best railway books that in emergency one should reverse the engine and give steam?

What with all this activity, the frenzied shouting of the Italians and quite picturesque British exclamations from the rest of us, there was pandemonium in the cab. Alas, it was too late. When he saw we meant business the crossing keeper abandoned his flag and bolted for the gate lever. Almost instantaneously the barriers flicked up like swords at a military wedding and we sailed triumphantly beneath them.

By this time the combined effect of the reverse steam and the action of the now functioning brakes was rapidly bringing us to a stand. With a wisdom I did not possess in that moment of lost confidence, the worthy Williams released the brakes, shut the regulator and wound the gear into the middle position.

'Better to carry on than stop and argue with him,' he reasoned as we drove on at a very sedate pace. 'Now I wonder who shut that pump valve?'

As I confessed, we negotiated the facing points into Bernardo and came to a stand in the platform with the utmost decorum. The moment we stopped, everyone seemed to start talking at once and it was some moment before I could step forward and explain our trifling misadventure to the Stationmaster. By this time I felt exceedingly guilty, for there on the low platform, surrounded by local inhabitants and with the Stationmaster at its head, was about eight feet of rather ancient red carpet — and I was in overalls without badges of rank. Not unexpectedly our conversation was somewhat cool but I tried to placate the old chap while the other men were sorting out the wagons, watched by twenty or thirty locals whose expressions revealed that they expected the engine to dash away madly at any moment.

An hour or so later the train of empties had been marshalled and we were ready to go home. As he filled in the details in the despatching book before getting line clear from Metaponto, the Stationmaster politely enquired the name of the driver. I told him, bowing stiffly from the waist as I did so. He then issued a special Caution Order for the level crossing and delivered a long lecture on the evils of reckless driving to which I listened attentively, believing it better to be considered reckless than to be thought incompetent.

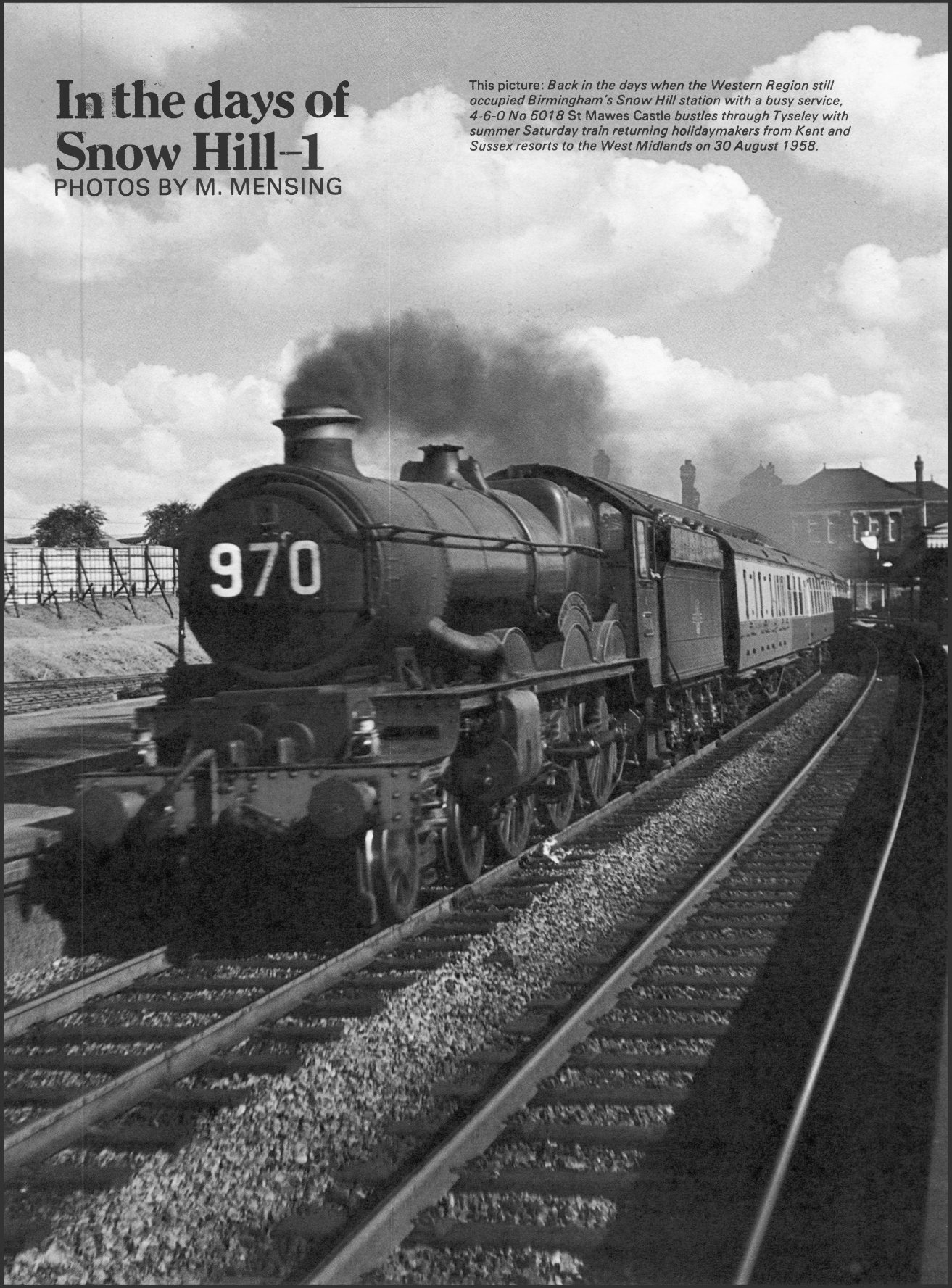
Eventually we got away, and with 31 wagons on the tender progress home was very different from our greyhound dash out. The gradient only rose slightly, yet the engine was being worked progressively harder and harder. For most of the latter part of the short journey the regulator was wide open with the poppet valves in full gear and we were using a great deal of steam. Quite a bit of the fire was going through the tubes and poor Walter was having a rough spell with the shovel. We nearly expired on the long left-hand curve into Metaponto, but the engine was going flat out; we could only hope for the best.

Looking back along the train on this curve to see if anything was dangling off the road (all good enginemen, of course, keep an eye on the train from time to time) I was astonished to see numerous people leaning out of the cabooses of the braked wagons and exchanging what appeared to be a very complicated system of hand signals with the *capo treno* at the back. Eleven of the 31 wagons on the train were brake-fitted and it was soon clear that every one was manned. It was equally clear that they all had instructions to apply the hand brakes from time to time to prevent scorching.

We eventually staggered into the station and came to a rather abrupt halt at the platform; a very light application of the engine brake was quite enough to bring the whole outfit to a most unworkmanlike halt. The engine was breathing very hard, eleven sets of brake blocks were smoking, ten specially recruited brakesmen leaned from their cabooses with wide grins splitting their silly faces, and the entire population of the village was on the platform to greet the triumphant return of the *maestro*.

In the days of Snow Hill–1

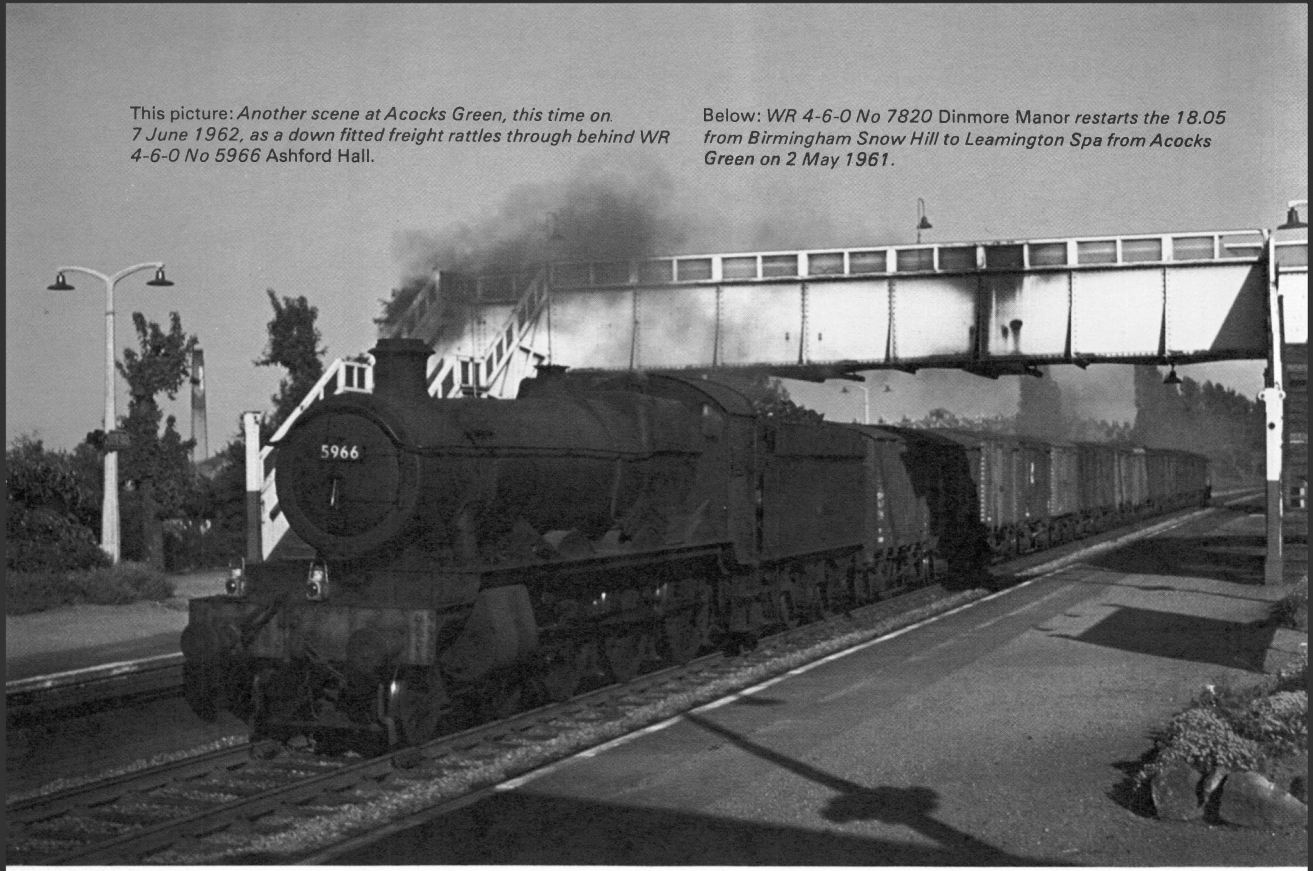
PHOTOS BY M. MENSING



This picture: *Back in the days when the Western Region still occupied Birmingham's Snow Hill station with a busy service, 4-6-0 No 5018* St Mawes Castle *bustles through Tyseley with summer Saturday train returning holidaymakers from Kent and Sussex resorts to the West Midlands on 30 August 1958.*

This picture: *Another scene at Acocks Green, this time on 7 June 1962, as a down fitted freight rattles through behind WR 4-6-0 No 5966* Ashford Hall.

Below: *WR 4-6-0 No 7820* Dinmore Manor *restarts the 18.05 from Birmingham Snow Hill to Leamington Spa from Acocks Green on 2 May 1961.*



Gresley's 'Green Arrow'

The engines that could have been as good as Pacifics

P. J. COSTER

Those who never knew Sir Nigel Gresley's Class V2 2-6-2s in action must form their opinions of the design from received history and hindsight. Those of us who saw and heard them, whether in splendour or neglect, find it difficult to be dispassionate. All of us, though, have *Green Arrow* herself to see, magnificently preserved. And we have, too, Peter Handford's superb artistry in sound recording to transport us back in time.

In particular, I think of Handford's haunting recordings of the Waverley route in *Trains in the Night*. The sounds of moorland night gradually still as away in the distance there comes the sound — the unmistakable sound — of a 'Green Arrow' going superbly on the gradient, in good mechanical condition, a joy to hear. But the real V2 follows later: No 60927 of St Margarets, a cylinder gland or relief blowing, the exaggerated Gresley three-cylinder beat, typical of the V2s, slipping slightly as she hammers up the long hill to Whitrope, no doubt with a heavy load. To hear Handford's 'Green Arrows' on the Waverley route is to step back 20-30 years in time, to the afternoon 'Scotch Goods' pounding out of London, or to the early morning at Connington, when powering the vast majority of the fast freights of the LNER and its nationalised successors.

By the early 1930s the LNER could boast a capable stud of locomotives for most of its operations. Certainly some were of riper years, such as the Atlantics and earlier pre-grouping 4-6-0s, but their work was good. There was no standardisation of design and little of components, such as there was on the GWR and such as was in train for the LMSR. Freight was as well catered for as on any other system, but the LNER was at its most far-sighted in introducing fast freight services. While Gresley's three-cylinder Class K3 2-6-0s could handle most of the freight duties, something rather bigger was required if both heavy trainloads and good speeds were to be features of the new services. Moreover, a bigger mixed traffic locomotive would be able to deputise for a Pacific. The Ivatt Atlantics could certainly run the Pacifics close for speed, but it was another matter if the trainload was heavy (with all due deference to Driver Walker and C1 No 4404 on the 13.20 Kings Cross-Edinburgh in a historic run recorded by the late Cecil J. Allen). Possibly the 'Sandringhams' might have deputised, but there was little congruency between the operating areas of the Pacifics and the 4-6-0s, except perhaps on the GC.

Gresley, having improved his A1 Pacific and built the A3 'Super-Pacifics' (to quote a popular description of the time), had with his assistant O. V. S. Bulleid no doubt followed the work of M. André Chapelon in rebuilding the Paris-Orleans compound Pacifics in the early 1930s. Little building was possible in the recession of the time and it was not until 1934 that the magnificent LNER 2-8-2s appeared. Hard on the heels of the P2s came Gresley's masterpiece, the A4 Pacific, at first sight a kinsman of the A3, but more importantly related to the P2. In 1936, when No 4771 appeared, she was a direct descendant of the A4 and not a 6ft 2in foreshortened A3.

Work had started on the design of a heavy mixed traffic locomotive in 1935. Earlier an outline design of a 6ft 2in version of the K3 articulated to a bogie version of the Group Standard tender had been considered. Whether the 2-6-4-4 was a hangover from Gresley's flirtation with boosters or an attempt to tie down the wagging tail of the K3 at speed is a matter for conjecture, but it would probably have been a burden to shed staffs. There is surely unanimity in the drivers' Valhalla that failure to build a 6ft 2in version of the K3 was a deliverance indeed — the K3s were not known as 'Jazzers' for nothing!

The choice ultimately lay between a large 4-6-0 and a 2-6-2. The 4-6-0 postulated was a powerful 6ft 8in three-cylinder locomotive with a shortened high-pitched Pacific boiler. On the face of it, the design had all the ingredients of an exceedingly rough-riding locomotive. The 2-6-2 offered a wide grate and A4 cab, many standard Pacific features and a virtual certainty of the smooth ride of the Pacifics. Gresley had no misgivings about the use of a pony truck at speed, for he had seen the K3s and P2s and the GNR 2-2-2s run at speed. While there was no overriding technical or operational reason for choosing one design or the other, the ability to base the 2-6-2 on the established Pacific designs carried the day, and wisely so.

So it was, then, that in June 1936 the strikingly handsome No 4771 *Green Arrow* emerged from Doncaster Plant, followed by Nos 4772-5. The five engines were deployed and assessed at depots all over the LNER before construction was commenced in quantity. No 4771 went to Kings Cross — 'Top Shed' — and her principal task was the haulage of the afternoon Edinburgh fast freight. No 562 down, the 15.40 'No 1 speed' braked goods to Leith Walk, was as much part of the East Coast main line as the 10.00

'Flying Scotsman' and was very much the showpiece for a railway selling fast freight services. The name *Green Arrow* was borrowed from a new guaranteed freight delivery service and the V2s became known as the 'Green Arrows, synonymous with fast freight operation.

Curiosity was aroused by the new engines and it was not long before the late Cecil J. Allen published two runs, one his own behind No 4771. The performances were baffling, to say the least, especially to an audience who had perhaps been encouraged by the Mikados to expect greater things of the 6ft 2in engines, and who might have assumed that the haulage of very heavy fast freight required greater power outputs than was indeed the case. Where the uphill work might have been lively it was relaxed; and where the downhill speeds might have been restrained they were not. The second of CJA's logs, across the Plain of York, confirmed that Gresley had produced a racehorse and not a Clydesdale.

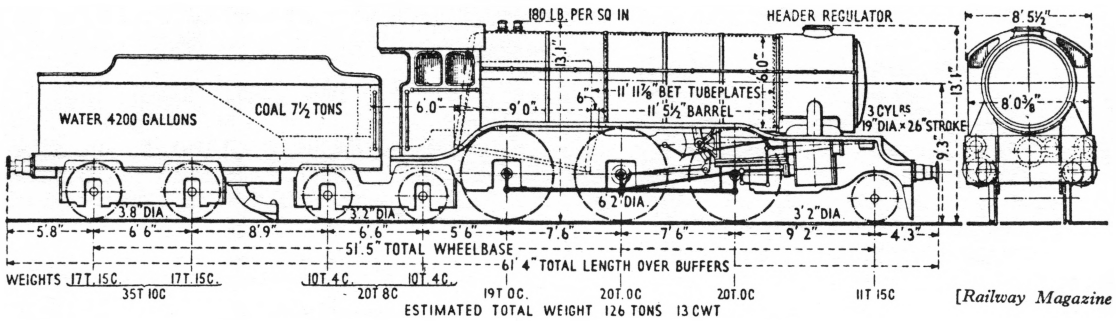
Now that we can look back at the work of the V2s over three decades the verdict is that this was the pattern for the work of the class for the future. The V2s were not outstandingly good performers on adverse roads with heavy loads, but they could fly downhill.

The V2s were built in considerable numbers. Their construction period extended almost throughout the war, 180 engines out of 184 having been completed by 1944. Gresley's successor, Edward Thompson, no doubt regarded the V2s as one of his lesser problems and forbore to make any design alterations. But he did substitute four new Pacifics for the last four V2s in Darlington's 1944 building programme; no doubt a precondition of this variation was that he should use the components already to hand for the V2s. The four Class A2/1 Pacifics, as they were eventually classified, could paradoxically be described as Pacific versions of the V2.

Above: *A Class K3 2-6-0, No 1896, wheels a southbound freight over Potters Bar summit, in the North London suburbs, on 23 October 1948.* / J. C. Flemons

Below: *Gresley's projected 2-6-4-4 design of 1935*

Below right: *The large-boilered 4-6-0 that Gresley considered in 1936.*



[*Railway Magazine*

THE CURIOUS GRESLEY 2–6–4–4 DESIGN OF 1935.

The V2s were built in this sequence:

Doncaster Works:

Year	*LNER Nos*	*BR Nos*
1936	4771-5	60800-4
1939	4843-6	60872-75
1940	4847-52	60876-81
1941	3655-60	60928-33
1942	3661-4	60934-7

Darlington Works:

Year	*LNER Nos*	*BR Nos*
1937	4776-95	60805-24
1938	4796-4814	60825-43
1939	4815-42	60844-71
	4853-62	60882-91
1940	4863-4888	60892-917
1941	4889-98	60918-27
1942	4899, 3641-54	60938-62
	3665-74	
1943	3675-90	60963-78
1944	3691-5	60979-83

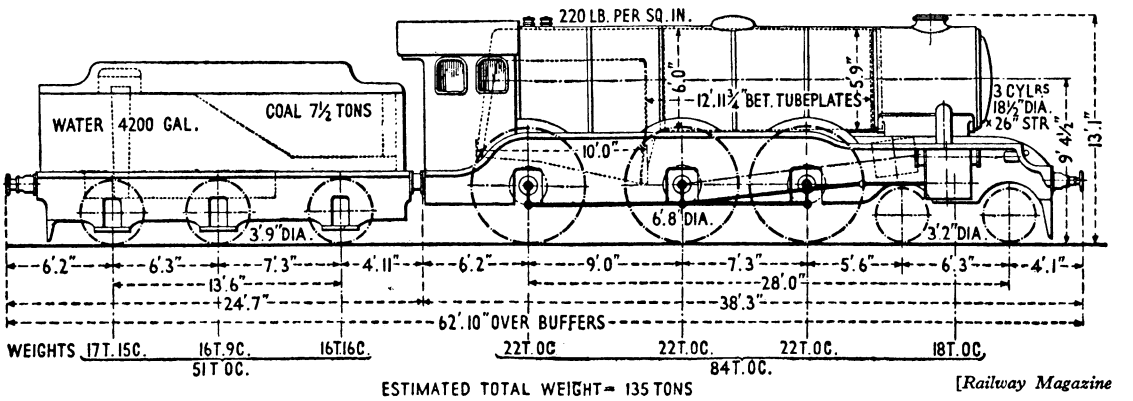
Note: Nos 4771/80/806/18/31/43/4 and 3676 (later Nos 60800/9/35/47/60/72/3/964) were named.

Over half of the class were built during the war and pitched straight into the melée of wartime operating and maintenance. Things were slow to improve once peace arrived. In a postwar world where competition for skilled labour was intense, where half the railway technical management, weary of the steam locomotive, looked to electric and diesel traction for the future, and where the other half sought standardisation Crewe-style and the simplification of two cylinders, Gresley's engines did not regain their *élan* and the panache of the 1930s. Many of the noble veterans of the pre-war years never recovered from the burden of war, added to the burden of their years. Enthusiasts keen to see the giants of the LNER revived had perforce to learn to distinguish the sound and sight of Thompson's Pacifics and, later, Peppercorn's. All too often it was neither, and we rapidly became familiar with the hurried beat and shorter-legged stride of the 'Green Arrows'. They worked anything and everywhere from the 10.00 'Scotsman' to the 'Ashburton Pullman' (the 11.30 Ashburton Grove-Holwell Class F refuse train). Times were bad for the A3s and, to a degree, the A4s: somehow the V2s kept going, despite convincing visible and audible evidence that they were unlikely to do so for much longer.

As things settled down after the war, maintenance and operating began to improve. The Pacifics' operation assumed a regular pattern at many depots and the use of V2s on passenger trains abated.

On freight work, matters remained fairly much as they were before the war, with the V2s in charge of nearly all fast freight and a great deal of medium-speed freight as well. A small number of freight duties were worked by Pacifics in order to balance a passenger turn or, on rare occasions, where someone wanted to hasten an engine up to its shopping mileage (it was beyond the pale to do that on passenger work). The V2s were unchallenged until the BR Class 9 2-10-0s, initially intended to replace the WD 2-8-0s on heavy, slow freights, demonstrated their ability on fast freight work and took over many of the medium-speed services.

As the locomotive fleet gradually passed through the workshops and depots began to tackle the arrears of maintenance, matters improved. By the mid-1950s a determined attempt was being made to improve Pacific performance and availability, and by the end of the decade matters improved radically. Darlington Works replaced the single three-cylinder casting with three separate castings. This required the outside steam delivery pipes to be located outside the saddle and from the front the converted engines looked like A3s or, maybe P1 2-8-2s. Their appearance was spoilt as a result.



[*Railway Magazine*

THE LARGE-BOILERED GRESLEY 4–6–0 DESIGN OF 1936.

No 4785

4817

Above left: *Class V2 2-6-2 No 4789 picks up its heels and gets the celebrated 'Scotch Goods' rolling near Sandy on 28 August 1939. This was the 15.40 'No 1 speed' braked goods from Kings Cross to Leith Walk, Edinburgh — a train that was almost as much a part of LNER lore as the 'Flying Scotsman'.*
/ E. R. Wethersett/Ian Allan Library

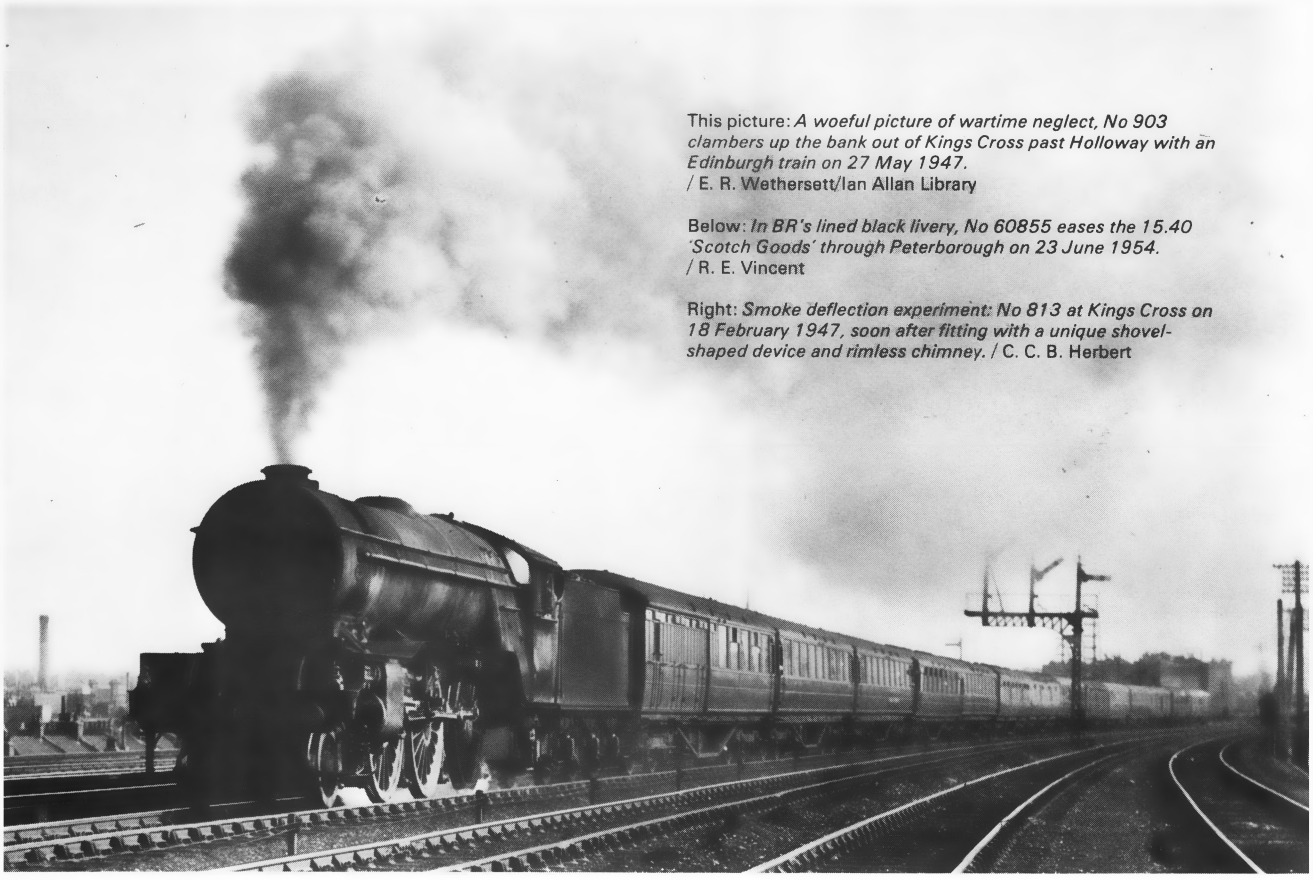
Left: *'Green Arrow' on the Pullman — No 4817 emerges from Hadley Wood South Tunnel, climbing out of Kings Cross with the down 'Yorkshire Pullman' shortly before World War II.*
/ C. R. L. Coles

Above: *The V2s were invaluable near-Pacific power for the surge of pre-war summer holiday extras. Almost new, No 4774 comes loping up to Hatfield with an eye-catching rake of pre-1923 vintage coaches: an LNW brake composite, then a string of four GC clerestories, a GC 12-wheeler, what looks like a GE kitchen car and finally more GC clerestories.*
/ E. R. Wethersett/Ian Allan Library

In 1956, the overhaul of ER V2s was transferred from Doncaster to Darlington. After some complaints from Kings Cross about sluggishness, it was found that no expansion allowance had been made in setting the valves (the same problem occurred with Peppercorn's A1s). The first diesel locomotives were emerging, but instead of using them on freight where their power and availability could make the greatest savings, the operators applied them to express duties (it would be kindest to pass quickly on from that particular subject). The steaming of the V2s had given some trouble over the years, as is discussed later, and since the Kylchap double blastpipes of the Pacifics had transformed their performances, it was felt that the V2s should be converted similarly. Alas, time was fast running out and only six locomotives were so treated.

The work of the V2s on the road is a reflection of the tractive characteristics of the design. That is an unoriginal thought that might be applied to any design, of course, but the consideration of the 'Green Arrows' as locomotives is a useful preliminary to considering their performances. Initially it was the capacity for speed of the 'Green Arrows' which commanded attention, but this was at a time when, with the greatest respect, the relationship between speed, load, gradient and horsepower was either misunderstood or disregarded, and the ability of a locomotive to give an apparently remarkable performance without exceeding 1,000IHP but momentarily was not greatly appreciated.

After the war the 'Green Arrows' stood in for Pacifics fairly successfully on passenger work until the advent of regular manning. The impression they still gave was of a locomotive which would not develop enough power for lively uphill work with a good load, but enough to fly downhill. On freight, while the loads were quite huge by contemporary standards, the



This picture: *A woeful picture of wartime neglect, No 903 clambers up the bank out of Kings Cross past Holloway with an Edinburgh train on 27 May 1947.*
/ E. R. Wethersett/Ian Allan Library

Below: *In BR's lined black livery, No 60855 eases the 15.40 'Scotch Goods' through Peterborough on 23 June 1954.*
/ R. E. Vincent

Right: *Smoke deflection experiment: No 813 at Kings Cross on 18 February 1947, soon after fitting with a unique shovel-shaped device and rimless chimney.* / C. C. B. Herbert

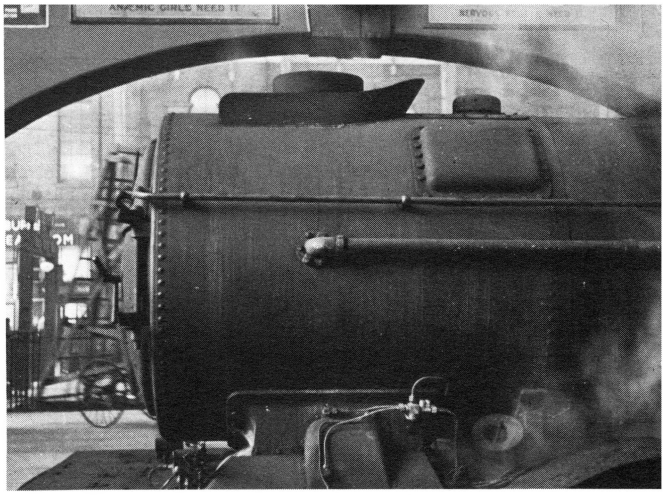
running speed achieved, or indeed necessary, on uphill and even level going were not indicative of a high power output. Now and again a V2 would make a superb run, but such performers were invariably in good mechanical condition even if it was not outwardly apparent.

A lament which will echo down the years, as those who love steam and rejoice to hear mechanical perfection pen their thoughts as I do, is that Sir Nigel Gresley's proposal for locomotive testing facilities and his contention that to accept any less was a waste of time and resources went unheeded. Never was Sir Nigel more of a perceptive and great engineer than in this context. As a result, we had to wait until 1948 for Rugby to open, and when Rugby and Swindon did make their contributions it was for the majority of the BR locomotive fleet too little and far too late to have any effect on design. The irony was compounded by the fact that only the V2, of all Gresley's engines, was tested. As a result we know less about Gresley's engines than many others!

In November 1946 new A2 (later A2/3) No 500 *Edward Thompson* was tested alongside V2 No 959 of Haymarket. The testing was neither searching nor exhaustive and the conclusion could have been written by many design and outdoor staff without bothering to carry out the tests. The A2 was a larger and far more powerful engine. Despite something of a shambles due to bad coal, the tests gave a glimpse of V2 performance. The engine ran well enough with moderate loads and speeds on the level, but under the whip the boiler tended to flag. In 1946 the engine barely got into her stride.

The policy of fitting LMR smokebox screens to achieve self-cleaning was extended to the V2s, often with disastrous results. At best, the steaming of V2s varied considerably if only for the reason that their general condition varied considerably. All classes have their good and bad, but the V2s which steamed with absolute freedom were relatively uncommon. It is probable that the correct functioning of the exhaust pump depended upon a fairly delicate balance of steam and gas flows and it required little to upset matters. The steaming capacity of some of the V2s so modified was seriously reduced and at New England No 60845 was reputed to be the worst of all.

It was decided to test a 'Green Arrow' at Swindon to determine the cause of the trouble and rectify matters and No 60845 was nominated as the guinea-pig. It was felt that if the Western could sort out 845 then they could make anything on wheels steam. Those of us who were partisans for Gresley, Doncaster and the East Coast, who regarded the tests as a sort of Victor Ludorum, were horrified at such an engine as our representative. We awaited the results with that sinking feeling which is often the precursor to the announcement of examination results.



The results of the Swindon tests are virtually the sum of our knowledge of the V2s. Truly, the steaming was awful. How could such an engine run at all? Many New England crews would say that she didn't. For the first time a Gresley three-cylinder engine was extensively indicated (ie, its cylinder efficiency was carefully measured), and the conjugated gear came under the microscope. Some extraordinary diagrams resulted, to the incredulity of the two- and four-cylinder devotees. In one revolution of the driving wheels, indicator diagrams were produced which might have resulted from at least four different cut-offs. Edward Thompson would not have been surprised.

Well, we who claimed to know our engines were not surprised at the bad steaming nor were we expecting text book diagrams from engines which so often seemed to be beating time to Lehar or Johann Strauss. But the interesting characteristic was that of improving performance with speed. Certainly once she had reached 60-70mph the V2 seemed to run far better, making due allowance for the greater kinetic energy. Once speed had been lost, the engine would not recover so well.

The exhaust was modified slightly and the maximum evaporation rate was doubled to 30,000lb/hr. Increased back pressure and coal consumption were the alleged results and if true, seem a remarkably high price to pay for the chore of cleaning the smokebox. One V2, No 60854, was noted by a deeply shocked member of the RCTS in Doncaster Plant being fitted with a copper-capped chimney, but fortunately wiser counsels prevailed at Doncaster.

Six V2s were fitted with Kylchap 1K/1C double blastpipes in 1960/1 and the steaming of these engines was far superior to anything known previously from a V2. The BTC had been reluctant to use this equipment and even went to the expense of equipping Nos 60817 /963 with a 'Royal Scot' double blastpipe to demonstrate that a simple double blastpipe was just as

good. Unfortunately, it demonstrated contrariwise that the BR version was no better than the V2 single blastpipe and very much inferior to the Kylchap exhaust. The transformation of the six V2s was immediate and dramatic, particularly at lower speeds where the V2 was not at its strongest.

There is no doubt amongst those who were concerned with these locomotives that the Kylchap V2s were vastly superior to the remainder of the class. It ceased to matter to drivers whether their engine was a Class A1, 3 or 4 Pacific or a Kylchap V2, for they all went like the wind. Had enlightenment prevailed, the conversion of V2 at the appropriate time could have added the equivalent of 184 Pacifics to the locomotive fleet: how much benefit would have been accrued to passenger and freight working over the years!

The 'Greeen Arrows' were built primarily for heavy fast freight work and there is no doubt that to it they brought an effortless mastery, even in the testing circumstance of war. There is also no doubt that the fast freights on the East Coast main line were indeed fast: even by passenger standards, the pace could be hot at times. There was the famous tale of Bill Hoole and an A4 on the 15.10 Kings Cross-Niddrie goods, No 266 down post-war, when he was turned out from slow to main behind the 'Talisman' and caught up with the express at Retford. There was the Hull lodging turn, 666 down and 581 up, with a Kings Cross Top Shed B1 4-6-0 often running only a few blocks behind the Copley Hill men with their A1 on the up 'Queen of Scots' Pullman, and there were the stalwarts of Boston with the Immingham K3s who came tearing up through Hitchin with their lengthy — and foul-smelling — fish trains 1271 and 1297 up, with Grantham men on an A1 ahead and Copley Hill men on another A1 breathing down their necks behind.

One of the fastest was the 'Buckingham Palace Special', No 611 up, the 21.00 from York, a light fish train hauled by an immaculate Top Shed V2, which went for London hell-for-leather. An evening north of Hitchin was an education, with the two freights to Leeds, one to York and another to Hull, going down in succession after the 19.30 'Aberdonian' doing 50, 60, even 70mph at times, wheels ringing, brake rigging and axlebox guides creaking and rattling, the intense cacophony of a hundred or more wheelsets flying over the railjoints, box vans swaying alarmingly. The mere thought of short wheelbase vehicles travelling at such speeds today would stand the hair on end.

Below: *By now with green livery restored, No 60916 starts the 10.48 Darlington-Manchester Exchange extra out of York on 1 June 1963; its smoke partially obscures Class K1 2-6-0 No 62042 on freight waiting to take the road behind it.* / P. J. Lynch

Right: *Scottish 'Arrow' — No 60818 throws a pall over Falkland Road at it threads Fife with the 12.50 Aberdeen-Edinburgh in March 1959.* / W. J. V. Anderson

60818

The allocation of the V2s in the 1950s shows the preference given to depots providing power for fast freights:

Kings Cross	15	Woodford	5	York	29
New England	23	Copley Hill (Leeds)	4	Gateshead	11
Doncaster	21	Ardsley	3	Heaton	22
March	6	Leicester	2	Tweedmouth	1
		Gorton (Manchester)	2	St Margarets (Edinburgh)	17
				Haymarket (Edinburgh)	4
				Tay Bridge Dundee	11
				Ferryhill (Aberdeen)	8

The London and Doncaster engines worked between London, Doncaster and York. York and Peterborough were points at which trains were remarshalled and engines were changed on many duties, even though they had not worked a particularly great distance — for example, just London-Peterborough. The Scottish engines were intended primarily for fast fish trains which were the majority of the long-distance freight services.

It is perhaps popularly assumed that the LMSR were to the fore in the use of long high mileage rosters and the deployment of locomotives on a common-user basis, but in the late 1930s some of the more mundane LNER services were linked up to form fairly demanding locomotive diagrams similar to those of the LMSR. I give below a typical freight diagram and one of the newer diagrams as examples:

Heaton No 32 Duty

TThSO	Heaton dep 17.40	'No 2 speed' goods to Dundee, arr 03.50
MWFO	Dundee dep 21.33	'No 2 speed' goods to Heaton, arr 07.20

York No 50 Duty

Sunday		York			
	arr 05.28	Edinburgh	dep	00.30	Parcels to Edinburgh
	arr 14.26	Newcastle	dep	11.40	Passenger to Newcastle
	arr 22.34	Edinburgh	dep	19.42	Passenger to Edinburgh
MThO	arr 17.14	Newcastle	dep	14.16	MthO 'No 1 speed' to Newcastle
TFO	arr 10.24	Dundee	dep	01.42	TFO 'No 2 speed' Heaton to Dundee
TFO	arr 14.06	Edinburgh	dep	12.36	TFO 'No 1 speed' to Edinburgh
TFO	arr 23.09	York	dep	17.15	TFO 'No 1 speed' to York
WO	arr 13.26	Newcastle	dep	10.30	WO Parcels to Newcastle
WO	arr 16.40	York	dep	14.45	WO Passenger to York
ThO	arr 02.40	Edinburgh	dep	21.22	WO 'No 1 speed' to Edinburgh

Left: *On 12 May 1953 SR 'Merchant Navy' No 35020 was crippled by a broken driving axle while at speed near Crewkerne with the 14.20 Waterloo-Ilfracombe. Metal fatigue was diagnosed and the whole class was temporarily withdrawn for ultrasonic examination. Amongst substitutes hurried to the SR were six V2s, which were shedded at Wath Elms and had a somewhat chequered experience in strange hands. No 60896 approaches Wimbledon with the up 'Bournemouth Belle' on 6 June 1953.* / Ian Allan Library

Above: *One of the V2s rebuilt with three separate cylinder castings and outside steampipes, No 60824, climbs to Glenfarg with the Saturday 14.55 Perth-Edinburgh Waverley on 3 July 1955.* / M. S. Burns

This picture: *'Arrow' on the Great Central — No 60805 blasts away from Nottingham past New Basford with a fitted freight on the evening of 10 June 1963.* / T. Boustead

The No 3 Express Goods link at Kings Cross was fully equipped with V2s by February 1939, the nine engines and men being rostered as follows:

Engine	*Driver*	*Duties (freight unless otherwise stated)*
4794	King F.	09.40 Grimsby fish empties (321dn), 03.25 ex-Aberdeen fish (552up)
4821	Griffiths	21.30 Ardsley (790dn), 00.40 ex-Colwick (912up)
4789	Moore	15.40 Leith Walk (562dn), 15.20 ex-Hull fish (754up)
4785	Lynch	21.00 Huskisson (774dn), 22.25 ex-Leeds passenger (919up)
4797	Blunt	10.15 ECS to Doncaster (359dn), up as required
4826	Jarrett	22.00 Nottingham (804dn), 17.00 ex-Huskisson (920up)
4771	Burgess	16.05 Dringhouses (577dn), 19.12 ex-Grimsby (864up)
4801	Jameson	11.30 York passenger (386dn), 13.17 ex-Leeds passenger (645up)
4816	Smith W.	20.30 Deansgate (773dn), 20.00 ex-Leeds (906up)

The freight services in the Southern Area of the LNER, which later in 1948 became British Railways Eastern Region, were worked by 'Green Arrows' from Kings Cross, New England, Doncaster, York, Copley Hill, Ardsley and March on the ECML, while York, Leicester and Woodford Halse worked those on the ex-GC Section. The following list gives the principal ECML fast freight services and balancing turns, as they were operated in the mid-1950s: it is in outline only, for duties varied through the week-end and destinations varied likewise.

London dep	*WTT No*	*Destination*	*MPD*	*Balancing Turn*	*WTT No*
00.05	1016	Doncaster Decoy	DON	23.30 dep Newcastle (Pcls)	103
01.15	520	Heaton	NWE	17.05 dep Peterborough N	847*
02.05	268	Niddrie	KX	21.00 dep York	611
07.35	1116	Doncaster Decoy	Don	13.45 dep Doncaster Decoy	1113
11.15	812	York (ECS)	Don	21.40 dep Doncaster (Pcls)	881
12.35	842	York (Parcels)	NWE	07.25 dep Peterborough	767
14.35	262	Haymarket	YK	21.30 dep Stockton	551
15.10	266	Niddrie	KX	21.10 dep Newcastle Forth	555
16.05	714	Dringhouses	KX	00.30 dep Inverkeithing	273
19.15	1224	Leeds	COP	20.00 dep Leeds	1343
19.25	102	York (Parcels)	DON	21.50 dep Doncaster	1321
20.15	660	York	YK	09.25 dep Peterborough N	793†
21.15	1266	Leeds	ARD	22.22 dep Leeds	1357
23.00	122	York (Parcels)	DON	21.45 dep Hull	591
23.30	524	York	KX	18.55 dep Hull	589

* 767 and 847 up were Class B passenger.

† 19.35 dep Niddrie, No 275 up, from York to Peterborough North No 793 up was a Class B passenger.

The Kings Cross duties were largely operated by the No 1a link using the best V2s available and these were kept in sparkling condition. It was uncommon to see a dirty Top Shed V2 in the 1950s. Although the Pacifics were generally kept fairly clean, it was not unusual down the line to see a travel-stained Pacific on the 15.45 down West Riding from Kings Cross or 15.50 Leeds followed by a gleaming V2 on 266 down.

Doncaster's V2s were generally clean, but New England seemed to be perpetually short of cleaning staff and their 'Green Arrows' ran in execrable external condition for many years. The lesson of years of watching the East Coast main line and travelling behind its locomotives was that external appearance was no guide to the locomotive's mechanical condition. New England's V2s were proof that one should not judge the wine by the glass.

Copley Hill and Ardsley received trios of 'Green Arrows' in the 1950s, mainly for each depot to work a lodging turn to London. These locomotives were kept in fairly good condition and were occasionally seen at Doncaster, Peterborough or even March on other turns.

The Ardsley turn, No 1357 up and 1266 down, combined to create a remarkable level of excitement for a pair of prosaic freight services. It was a lodging turn worked by Ardsley engines and men and Ardsley had difficulty in keeping two of their three V2s going so as to cover the duty. At first the occasional B1 came up, but until the V2s received general overhauls B1s deputised regularly: on at least three occasions J39 0-6-0s appeared and they were nights to remember indeed — especially for the crews!

Not only did the Ardsley lodging turn produce some

odd visitors, but it appeared in some odd places. Twice the down train, on the down goods line north of Hitchin, took a header into the bog behind Arlesey down platform, curiously involving an A3 each time — *Centenary* and *Blair Athol* if I recall correctly. No 60861 on 1357 up dived through the up goods sand drag at Oakleigh Park and emerged from the brambles by the footbridge, to the general astonishment of early morning commuters. These incidents prompted deductions about road knowledge and crews being overly casual with Gresley's locomotives, but the turn was also dogged by ill luck. A Doncaster V2 on 1116 down suffered a derailment of part of the train at Arlesey and 1357 up ran into the wreck, and in an incredible multiple freight collision at Hitchin, yet again 1357 up ran into wreckage (the latter incident is illustrated in Peter Townend's book *Top Shed*).

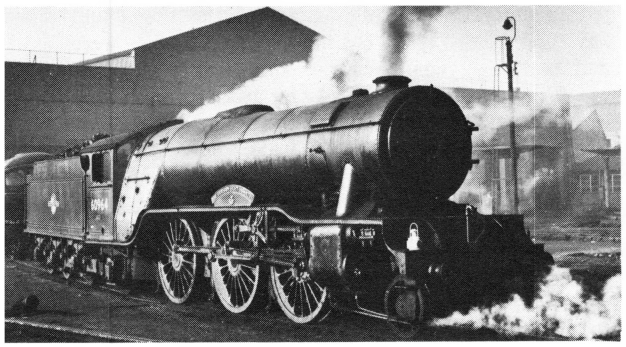
The Scottish V2s worked the East Coast main line and radiated from Edinburgh to Perth, Glasgow and Carlisle. After nationalisation they worked from Aberdeen to Perth, Glasgow and Carstairs and, in their last years, to Carlisle. Curiously, Carlisle Canal depot had A3s but no V2s; however, a considerable number of St Margarets' V2s worked out-and-home turns over the Waverley route, hauling considerable loads over that lonely, gruelling road. The St Margaret V2s nearly always had the appearance and sound of engines which were ill-kept, but there is no doubt that they lived a hard life.

The V2s were popular in Scotland and there was little that was beyond an engine in good condition. The Scottish and NE Area V2s were overhauled at Darlington after the war and the Scottish engines were rarely seen south of York. Where speeds were not high the ability of the V2, with its big grate and boiler, to slog away on a difficult road was a great asset. Ferryhill V2s were often used on passenger turns, even in the last days of the class.

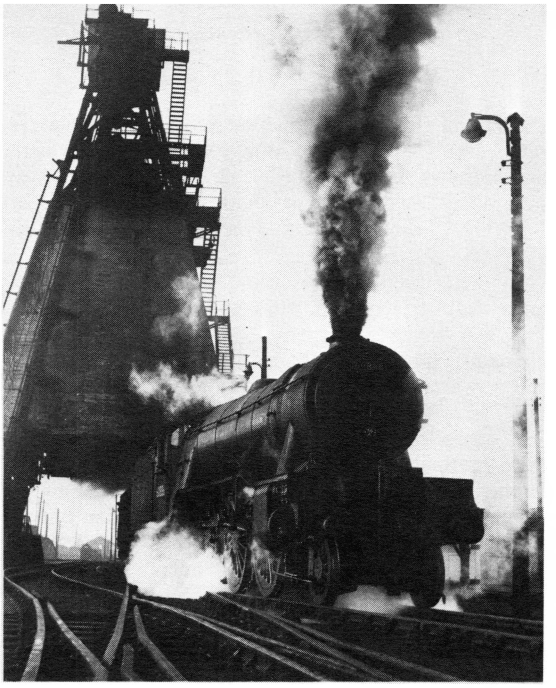
In their three decades the 'Green Arrows' did a great deal of passenger work of one sort or another. The war years saw them working anything from 20coach expresses to coal trains with equal success, and it was the combination of size and the ability of the V2s to endure adverse conditions of maintenance and operation better than the Pacifics which made them particularly valuable. For this reason they were dubbed the 'engines which won the war', a title to which other locomotives might also lay claim, but on the LNER there was no doubt as to their value.

The role of the V2s post-war on passenger work was still very much that of the 'Second XI', despite the construction of 90 rebuilt or new Pacifics. On days preceding Bank Holidays and busy summer weekends, the East Coast main line service proliferated and an enormous number of relief trains were added to the normal motive power requirements. It was at times like this that numbers of 'Green Arrows' were conscripted from nocturnal freight work and as the day wore on — and no doubt for the operators 'wore' is a *mot juste* — it became awfully clear that what was good enough for a 'No 2 speed' goods was not good enough for passenger work. Eventually coal, a dirty fire or a hot box would take its toll at Claypole, Connington or some similarly remote spot and *rigor mortis* would set in.

Below: *Named 'Arrow' — No 60964* The Durham Light Infantry *on pilot duty at Gateshead in October 1961. Some of the V2s' epic feats were put up when they were called up from standby for emergency duty.* / P. J. Robinson



Right: *Kylchap double-chimney 'Arrow' — No 60902 emerges from Hadley Wood North Tunnel with the 10.25 Kings Cross-Peterborough on 12 March 1962. Kylchap V2s 'went like the wind'; similar conversion of the whole class, not just half-a-dozen, would have handed the East Coast Route the equivalent of 184 Pacifics.* / M. Edwards



Valete — *York's last V2, No 60886, ambles away from the shed's coaling tower.* / Rodney Wildsmith

Perhaps it might be considered by the reader that the author's sympathies are biassed towards the southern end of the LNER: maybe so, but the V2s allocated to Top Shed were kept in outstanding condition and it was encouraging to see what could be done when resources were available. In the summer months, the engines in good condition were extensively used on passenger work. The relief to the 10.00, 44 down, was a V2 turn at one time, engine and men working to Grantham and returning with 73 up, the first portion of the up 'Northumbrian': another was the 14.18 to Leeds, again engine and men to Grantham, returning with 71 up, 17.15 ex-Leeds, 15 coaches and 550 tons fully laden, the heaviest passenger train of the day.

It was not unusual to see good V2s running 6-7,000 miles a month. In the four weeks ending 14 August 1955 five engines, Nos 60862/903/14/43/83, covered 7,657, 7,385, 6,907, 6,427, and 6,885 miles respectively. During one week in 1957, Kings Cross turned out three immaculate 'Green Arrows' for the down 'Yorkshire Pullman' on three consecutive nights. In 1953/4, No 60800 ran 173,959 miles between general overhauls with an intermediate at 88,376. For Nos 60821/914 the corresponding figures were 167,316 and 171,472, with intermediate repairs at 77,823 and 83,137. In July 1957 the accumulated mileages since general overhaul for six engines were:

No	*Mileage*		
60800	81,421	60876	89,537
60814	90,410	60914	79,987
60821	78,008	60950	140,335

In the pre-war days, Doncaster very occasionally rostered 'Green Arrows' to the 'Yorkshire Pullman' and one, No 4817, made a superb run. The high point in their passenger career must be the occasion when No 4789 replaced the rostered A4 at the last minute on the down 'West Riding Limited' streamlined express. Drivers on the GC section who ran B17 4-6-0s at 90mph and more with reasonable loads were unlikely to be troubled repeating the performances with 'Green Arrows' and so it was. In Scotland some lively running was experienced at times, although loads here were relatively moderate.

The role for which the V2s are often remembered is that of pilot. Some of their best work came as a result of relieving a failed Pacific; both Bill Hoole and Ted Hailstone had on occasion to change to a pilot engine and make the best of it. I recall Ted's vexation at *Silver Link* having a hot box at Grantham on the 'Tees-Tyne Pullman', with a footplate passenger on board, and being mollified by getting No 60853 as substitute. Now No 60853 was due for general overhaul — indeed, it retired to Plant some weeks afterwards — and as Hailstone whacked his old nag along the sight of his guest's obvious discomfiture appealed to his wicked sense of humour.

It was a similar situation which enabled a Kylchap V2 to give us the only demonstration of the real ability of a V2. Taking over from a failed Deltic at Peterborough, the engine — No 60858, I believe — cleared Stoke at 68mph with 11 coaches. The train weight was probably 380-390 tons and although no more is known about the performance, it shows that the Kylchap V2 was almost equal to the finest exploits of the A1s and A4s.

So there it is, in a very abbreviated form. To those who were particularly fond of Gresley's locomotives, the 'Green Arrows' have a place of honour. They could have been so much better with a higher standard of maintenance and design modifications, principally redraughting. It is true of most designs that they could have been better, of course, but they were as they were and the V2s served us well when they were needed.

No more will No 60892 stagger away from Hawick to Whitrope wheezing steam from the glands, nor Essendine shake as No 60893 tears south on a relief Hull express, nor York roof echo to the exploding roar as No 60952 struggles to move her train away. The particular sound for which the V2 is remembered is that distant, strident Gresley beat in the still and quiet night as the fast freight begins to gather speed.

I would like to add my thanks to my good friend Eric Neve for his assistance in preparing this article.

Requiem for the BR fish van

The rot was started by the strikes of 1953

ALAN JEFFREYES

The Gresley 'Green Arrows'' deeds on the Eastern fish trains, recounted in the previous feature, reminds one that the fish van is almost as rare a sight on British Rail metals today as a V2 in steam. At the end of 1976 BR had little more than a score of the vhicles left in active freight movement stock. Yet at nationalisation BR was not only running close on 3000 wagons of pre-1948 build specifically nominated for fish movement, but had to extemporise with vehicles of other types to cope with the traffic offering.

Design of modern stock was put in hand by the LNER in 1945 and the brake-fitted 15ft-wheelbase Insul-Fish van was put into production by the Railway Executive in 1950. In 1957-8 traffic was still buoyant enough to warrant fitting 275 of these post-war vans with roller bearings to eradicate hot box delays to the overnight fish trains from Northeast Scotland to the south. Taking its cue from the identifying blue circle on the vans, the Scottish Region, then addicted to naming its principal freight trains, promptly dubbed the 12.30 Aberdeen-Kings Cross the 'Blue Spot Special'.

But erosion of the fish business had already been set off by the 17day strike by footplatemen belonging to the Associated Society of Locomotive Engineers & Firemen over differentials that began on Whit-Saturday 1953. The National Union of Railwaymen's threat of a strike the previous winter had worried the merchants. The actuality of an all-line stoppage, the first since 1926, persuaded many that the road transport they had chartered as a temporary expedient was less susceptible to post-war industrial unrest and they left the railway for good.

Large wholesalers like the Ross Group soon built up their own road fleets for bulk movement from the docks. Within a few years BR found itself carrying too few wagonloads and far too many consignments of a box or two to be put off at wayside stations, what time the consignor was sending his major despatches by road juggernaut to the big towns. By the late 1950s Grimsby was warned that its docks had become a liability to the British Transport Commission. Though this historic fish port alone was still despatching around 300 wagons a day on eight trains, to Banbury (2), Nottingham, Manchester, Leicester, Leeds and London (2), the BTC complained that a quarter of the wagons were carrying less than a ton of fish and 10 per cent less than half a ton; only 15 per cent were loaded with 2tons or more. In a decade up to the mid-1960s BR's forwarded fish tonnage slumped by 55 per cent. Granted, the trade itself was contracting, but by not nearly so much. BR was still operating 25 fish trains daily from Grimsby (8), Hull (7), Fleetwood (5) and Aberdeen (4), but their payload averaged a beggarly 35½tons per train. Receipts were not even covering direct costs, inflated by the heavy trans-shipment expenses of the small consignments which now made up most of the rail movement. Efforts to coax traffic back from the road by substantial rebates for guaranteed vanload flows to the conurbations were having scant effect.

The BRB had had enough. In the spring of 1964 it laid proposals before the fish trade for a drastic rationalisation. The daily fish trains would be cut to nine, three from Grimsby, three from Hull, two from Aberdeen and one from Fleetwood, which would be marshalled to cover the countrywide market in vans for just 25-30railheads; onward distribution from these railheads would be by road, and merchants would be charged a wagonload, not a per-consignment rate. The scheme was duly introduced that winter, but the majority of merchants wanted none of it. The prospect of their precious perishables undergoing so much trans-shipment handling appalled them — and in the Home Counties road distribution from Kings Cross proved very vulnerable to disruption. At Fleetwood and Hull the merchants promptly decided to invest in their own transport co-operative.

BR had come to the last stretch of its road with fish traffic — perhaps not involuntarily — and in England and Wales at any rate the daily blue-spot fish train is as extinct as a blue Pullman. From time to time there has been talk of tempting fish back on to rail via Freightliners, but no visible follow-through.

The pathetic residue of BR fish vans at the end of 1977 consisted of 12 in Scotland, all fitted with air brake pipes in 1976 — seven were actually conveying fish between Aberdeen and Wick; five were on sundries movement between Glasgow and the North — and 16 in store at Milford Haven. A further 78 survived as barrier wagons for oil trains. Around 200 Insul-Fish vehicles that were redesignated Insulated Goods Vans have all been scrapped in recent years.

From DP2 to Dreadnought

The turbulent career of BR's Class 50 diesel

ROGER FORD

Many engineers would undoubtedly have led less stressful lives had the English Electric Class 50 locomotives never been built. Yet while the class has probably caused more trouble than most, it is still with us, having survived a period which saw numerically stronger classes go to the breakers yard in the interests of rationalisation of the diesel fleet. More, it enters its second decade in revenue-earning service a reprobate reformed, working harder and better than ever before and an essential, indeed unique, part of its user's motive power requirements.

Nor should it be forgotten that during its protracted teething troubles — which as we shall see were in many cases inflicted on a basically sound design — it had maintained a reputation for hard work when it was working. For all this, the 50s have tended towards anonymity, noted only by enthusiasts as usurpers of the precious 'Westerns'. But in the writer's view we are in for a Class 50 revival. All the ingredients are there; small numbers, only 50 built, technical idiosyncracies and now names, a cult class in the making.

In theory, the Class 50 design should have been the least troublesome of all those ordered under the BR modernisation plan. If any locomotive was born with a silver spanner in its tool box this was it. For a start it had an impeccable pedigree. Its makers, English Electric, had supplied the power equipments for Nos 10000 and 10001, Britain's first main-line diesel locomotives, and supplied nearly 800 main-line diesel locomotives under the modernisation programme plus another 1,200 of the ubiquitous BR standard shunter power equipments. The engine for the class was the V-16 from the EE range which had first appeared in service at 1,600hp in Nos 10000 and 10001. At 2,000hp it powered the Class 40s, a true workhorse, plus export locomotives for Rhodesia and Australia. Similarly, the electrical equipment was in many cases similar to that already in service on BR — the traction motors, for example, were already to be found under the Class 37 and Class 55 fleets. On top of this, the production Class 50 locomotives had the benefit of over 625,000 miles of intensive prototype service running in five years with the English Electric DP2. And before that the V-16 engine — the 16CSVT — had been running on the test bed for many hundreds of hours.

It is with the engine that the Class 50 story starts — and inevitably this will be a personal story because the author was involved in the first three chapters. However, first a brief discussion of the methods used to increase the power output of diesel engines is necessary. The basic tool is the turbo supercharger: that forces more air into the engine, which can then burn more fuel. To get more power from a supercharged engine, the engineer can make the turbo-chargers run at higher boost pressures and force even more air into the cylinders so that even more fuel can be burnt. But never in engineering does one get something for nothing. The more the air to the cylinders is compressed, the hotter it gets, which both lowers its density and the efficiency of combustion. Thus above a certain point more turbo-charging is self-defeating. This problem is overcome by the use of intercooling; after the air has been compressed it passes through a heat exchanger or radiator which cools it, thus increasing its density. The effect of intercooling can be seen on BR most days. The Class 40 at 2,000hp has a turbocharged engine with 16 cylinders — hence the designation for the engine 16SVT, where '16' is the number of cylinders and 'S' for supercharged. The Class 37 at 1,750hp is in fact running derated; the true output of its engine is 2,025hp, at which power it runs today in English Electric locomotives all over Africa. Thus for practical purposes the Class 37 is as powerful as a Class 40: yet it has a 12 cylinder engine. However, the engine is the 12CSVT and the 'C' stands for charge air cooled; inter-cooling has enabled the diesel engineers to save the cost, weight and complexity of four cylinders for the same power output.

At the time of the 1955 Modernisation plan most railway engineers thought that 2,000hp was the maximum that would be required from diesels. Few steam locomotives gave anything like as much and certainly not continuously. Thus in the development of the English Electric range the application of intercooling to the V12 to make it a compact 2,000hp unit took precedence over the uprating of the V16, which would have a rating of 2,700hp with intercooling. On BR, the rival high power engine was the Sulzer 12LDA28. This entered service in 'A' form at 2300hp in the first 10 'Peaks' (now Class 44) and then at 2,500hp in 'B' form (with inter-cooling) in what are now the Class 45s. However, by the end of the 1950s the operators on BR were beginning to realise that more horsepower was going to be required for the faster and heavier trains of the next decade and around 2,700-2,800hp was the magic number. For Sulzer it meant only a relatively small uprating of their 12LDA to 2,750hp to produce the 'C' version. For

This picture: *In the era immediately preceding completion of electrification to Carlisle and Glasgow, Class 50 No D447 was photographed at Lamington with a Glasgow-Birmingham express on 26 March 1970.* / Derek Cross

This picture: *Another pre-electrification scene on the West Coast main line — Preston on 10 June 1968, with Class 50 No D404 getting hold of a Birmingham-Glasgow express.* / Derek Cross

Below: *Class 50 on the Western — No 50.007 negotiates the sea wall stretch at Dawlish with a Penzance-Liverpool express on 29 May 1976.* / L. Riley

Prototype of the 50s, English Electric's No DP2 rumbles through Finsbury Park with the up 'Yorkshire Pullman'. / English Electric

English Electric it presented greater problems. While the necessary cylinder pressures and temperatures were being attained in the inter-cooled V12 engines running overseas, an inter-cooled V16 had yet to run and BR was already becoming wary of ordering untried equipment.

Thus development testing began at Rugby of the first 16CSVT and the author was one of the test team. Some engines *look* powerful and the 16CSVT is one of them. The extra two cylinders in each bank compared with the V12 give it an impressive length for its width and height while the four turbo-chargers, one at each 'corner', result in a pleasing symmetry. As an engine it just ran and ran with very little trouble, which augured well for the future, as did the fact that by the time it was installed in a locomotive, locomotives powered by the V12 version had already run over five million miles in revenue-earning service.

The next stage was to run it in a locomotive. It is a powerful reminder of the money at stake during the Modernisation Plan that English Electric was not the only firm building prototype locomotives at the same time; and it was here that engineering became involved with politics. The first requirement was for the engine to get some traction miles in. But with what was clearly going to be the last big order from BR at stake it would be advantageous if the engine test bed could also demonstrate what English Electric could do to meet the British Railways requirement for a 2,700/2,800hp Type 4. At this time English Electric was already building a high power locomotive in the form of the 22 'Deltics', which conveniently enabled the firm to produce a test bed for the 16CSVT that would also be a practical locomotive by extending the 'Deltic' production to 23. As the first Class 55 'Deltics' entered service in 1961, and the teething troubles started with the Napier engines, the installation of the V16 in the 'Deltic' locomotive body shell also took on the aspect of an insurance policy should the teething troubles be incurable.

Thus, on 2 May 1962, the test vehicle for the new engine, which was also English Electric's entry in the Type 4 selection trials, left Vulcan works for its first run and after a single test a week later, in which it neared Shap summit with a 15coach train at 43mph after passing Tebay at 80mph, it went straight into revenue-earning service on the LMR. Of the three prototypes chasing the BR order, DP2 was the last to enter service and the only one without a name. The author joined the English Electric Traction head office as the locomotive was about to appear. The rival designs had names — BRC&W *Lion* and the Brush *Falcon*. Our loco ought to have a name too. A list was prepared and narrowed down. But none of the names appealed to the Deputy MD, who had taken over the job of selection. It was one name in particular which ended the idea and left the prototype to be numbered. That was *Challenger*. 'We are not challenging anybody', rumbled the Deputy MD in a memo, 'the

rest challenge us'. But the locomotive had to be identified somehow. The original 'Deltic' had been the company's first prototype, so the new locomotive was the second — Diesel Prototype 2 in fact; and DP2 it was.

The life and times of DP2 have been well chronicled. Suffice to say that when it found its way from the LMR to the ER in July 1963 and was based at Finsbury Park (where the author was a very junior site engineer) it was slotted straight into a 'Deltic' diagram, to which extra runs were added as we found that DP2 required only a minimum of hours for maintenance. This year included a run of 43,000 miles in 58 days. But despite the conspicuous success of DP2, which continued up to its untimely demise in 1966, it did nothing for English Electric's sales efforts in the home market. That was because, while DP2 and the other prototypes were being built, BR in collaboration with Brush was designing the definitive standard 2,750hp Type 4. This weighed a ton less than Brush's *Falcon* prototype and was 5ft 4in shorter overall. For motive power it had not the high-speed Bristol-Siddeley Maybach engines of the *Falcon* but the Sulzer 12LDA28C of the *Lion*. Thus the three prototypes had had little direct effect on future motive power policy. Brush had won with a different design, BRC&W had lost their final fling and English Electric kept on trying.

Ironically, one of the arguments used against the purchase of a production run of DP2s was the jump in power output from the 2,000hp of the existing Class 40s to 2,700hp. In contrast, the Sulzer 12LDA28C of the Class 47 was only 250hp more powerful than the engine in the Class 45s and so, it was thought, the railways could be more confident of its reliability. As we now know that sense of security was illusory and all the Class 47s subsequently had to be derated to 2,580hp. Meanwhile, however, production of Class 47s rolled on and it is worth recording that while in 1978 BREL at Doncaster can build one Class 56 locomotive a fortnight, in 1965 Brush was delivering 10 Class 47s a month from its Loughborough works.

Above left: *Super-power for speed on the Anglo-Scottish service pre-electrification: Class 50s Nos 431 and 422 in Drumlanrig gorge with the Sunday 09.55 Glasgow-Euston on 21 May 1972.* / J. H. Cooper-Smith

Left: *The seldom-photographed 'West Coast Postal' caught in the first light of 5 June 1970 between Abington and Crawford behind a single Class 50, No 405; to have seen the dawn north of the Border it must have been running well behind time that day.* / J. H. Cooper-Smith

Right: *Class 50 on the Lickey: from May 1974 the class began through working from Birmingham to Devon on the 13.20 Liverpool-Plymouth and 07.40 Penzance-Liverpool back, and No 50.025 was found on the northbound train on 6 June 1974.* / Philip D. Hawkins

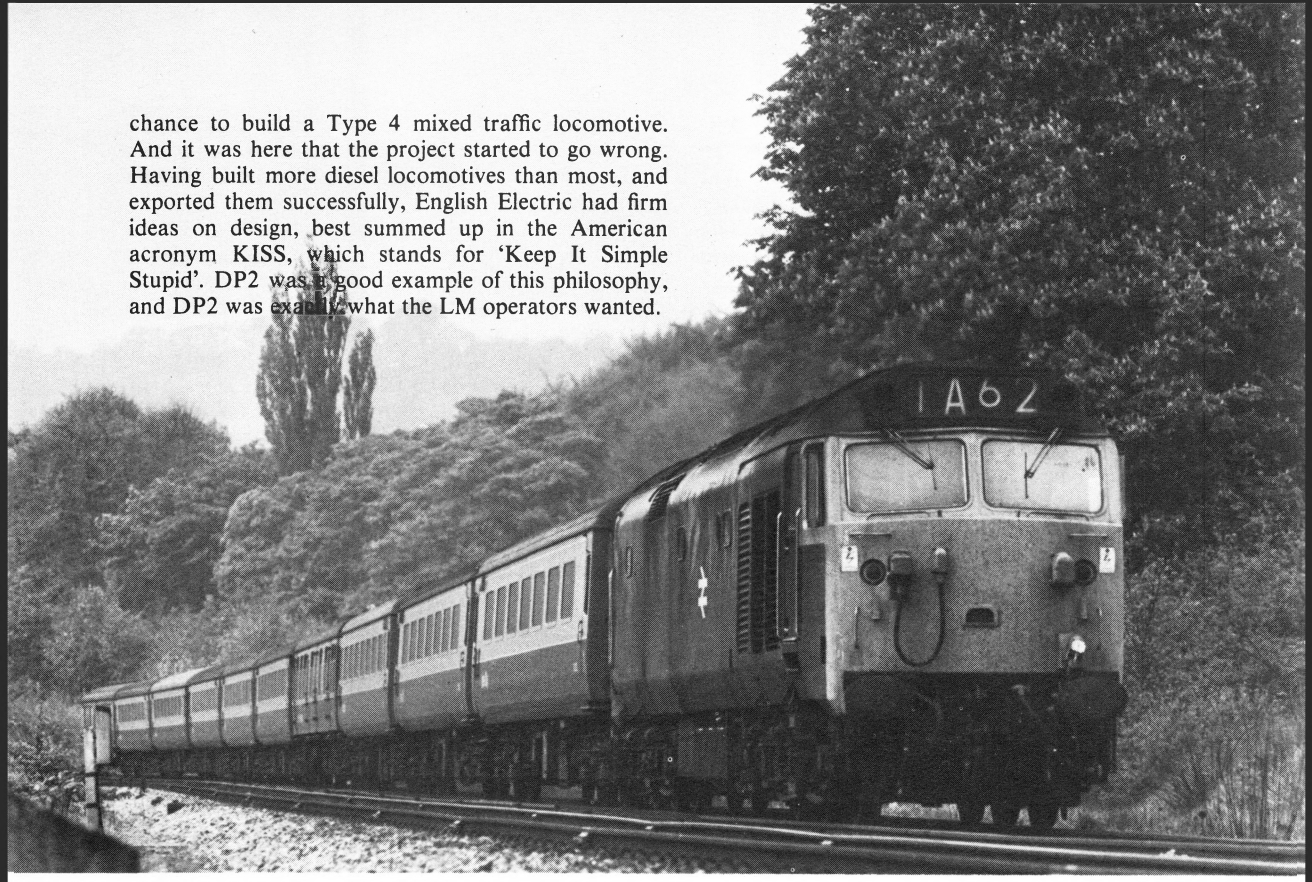
Then in 1965, when all seemed lost and BR, apparently, had ordered all the Type 4s it needed, an enquiry was put out for a further 50 or 112 locomotives. With the Sulzer engine troubles emerging, the enquiry invited tenders for either more Brush Class 47s, or Brush locomotives with English Electric engines or production DP2s. Inevitably politics were involved. The enquiry had been put out at the behest of the Regional lobby and the BRB operating staff were not convinced that the locomotives were needed at all. Meanwhile, English Electric had already prepared designs for the next generation locomotive requirement, a 4,000hp 1Co-Co1 powered by two 12 cylinder turbo-charged and intercooled engines. When the tenders put in expired in July 1965, it seemed that DP2 would never get into production. But then a specific need emerged in one Region and English Electric pulled a rabbit out of the hat.

The requirement was for 100mph locomotives to maintain timings on the LMR over the hills north of Crewe until electrification was extended from Weaver Junction to Glasgow. It might have been thought that the proposed English Electric 4,000hp unit would have been more suitable, but the need was foreseen only as short-term, after which the locomotives would be allocated to other duties. Thus by running pairs of Type 4s in multiple the LM could attack Shap with over 5,000hp on the front, while later on the next user would have a standard Type 4. Why a fleet of standard Brush Type 4s was not geared for 100mph running remains a partial mystery. What is known is that the LM operators still had fond memories of DP2 from its days on their Region and, as with the 'Deltics', English Electric made an offer which it was hard to refuse. It would lease BR the necessary locomotives.

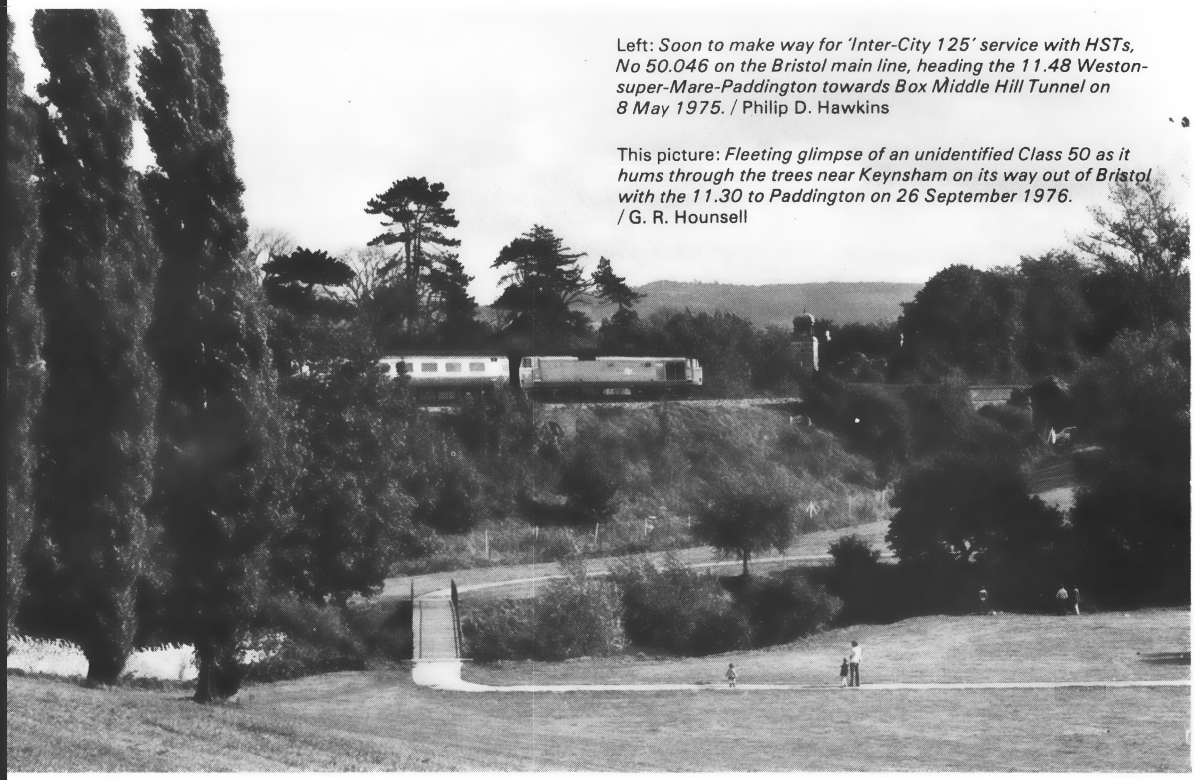
This was an ingenious ploy; under it BR would get the locomotives without spending precious investment capital and would know exactly how much the fleet would cost per year during the lease. At the end of the lease there was an option to buy the locomotives at favourable terms. The builder, on the other hand, got badly-needed work for his factories and could write off his investment in the locomotives against tax over the years. The only sign that the Class 50s were not BR's own was the small plate on the bodyside advising that 'This locomotive is the property of English Electric Leasings Ltd.' The deal was further encouraged by political pressure to maintain continuity of production at English Electric's Vulcan Works, where the locomotives were assembled and the ending of the flow of orders from BR, which had meant a constant workload over the past decade, was being felt. The 50 Class 50s would help bridge a gap.

If the BRB operators were not sure whether they wanted the new locomotives, BR's engineers had no doubts. As the diesel motive power menagerie built up during the modernisation programme, BR learned the hard way about diesel locomotive design. By the time the Brush standard Type 4 was mooted BR knew a fair bit about diesel locomotives and became involved in the design and, of course, built nearly half the fleet itself. But once one has done something it is always apparent how, given a second chance, it can be done better. The production version of DP2 was the second

chance to build a Type 4 mixed traffic locomotive. And it was here that the project started to go wrong. Having built more diesel locomotives than most, and exported them successfully, English Electric had firm ideas on design, best summed up in the American acronym KISS, which stands for 'Keep It Simple Stupid'. DP2 was a good example of this philosophy, and DP2 was exactly what the LM operators wanted.



Below : *Seawall grandstand for No 50.038 as it rumbles over the esplanade bridge at Dawlish with the 07.30 Paddington-Penzance on 11 June 1975.* / P. J. Fowler



Left: *Soon to make way for 'Inter-City 125' service with HSTs, No 50.046 on the Bristol main line, heading the 11.48 Weston-super-Mare-Paddington towards Box Middle Hill Tunnel on 8 May 1975.* / Philip D. Hawkins

This picture: *Fleeting glimpse of an unidentified Class 50 as it hums through the trees near Keynsham on its way out of Bristol with the 11.30 to Paddington on 26 September 1976.* / G. R. Hounsell

But the BR engineers had other ideas. There were all sorts of ideas they wanted to try out and the new locomotives became veritable Christmas trees, adorned with all sorts of equipment and systems which had not been tested anywhere, let alone on DP2.

English Electric were appalled. For a start, the pointless complexity completely negated the company's design philosophy. Perhaps more important, the leasing arrangement included a guaranteed 84 per cent availability. As good engineers the makers knew that while a copy of DP2 would have achieved this fairly easily, the new design — called by BR the 'BR-EE Type 4' — had all the makings of a problem child. So much so, that on a visit to the company in 1967 when the full details of the new design were released, the writer was taken on one side and told in no uncertain terms of English Electric's concern, with chapter and verse, for an editorial comment in *Modern Railways*. What had been planned as a cheaper and lighter Type 4 had turned out to be heavier, longer, dearer and more complex.

For a start, in addition to the generator and traction motors the new Class 50 had 14 other electric motors driving auxiliaries with the associated complication of brushes, contactors and wiring. The new locomotives would also be fitted with the English Electric KV10 solid state field supply units for excitation of the main generator and train heating generators. More solid state control systems gave unprecedented wheelslip control for the time and the locomotive could be driven either conventionally, with control of horsepower, or with a tractive effort pre-set by the drivers maintained constant during acceleration. The KV10 was really first-generation solid state with little use of modular construction; it was very much a closed black box. The writer recalls that when a prototype being tried on a Class 37 failed at Stratford depot, all the engineers could do was stand and look at the recalcitrant black box until an electronics wizard arrived. In contrast, an ordinary control system could always be sorted out with multimeter, battery and bell. Be that as it may, when it worked the KV10 based-system greatly enhanced acceleration by making the best use of available adhesion. DP2 with KV10 could out-accelerate a 'Deltic'. But having installed this system BR added an anti-slip brake which not only acted more slowly than other slip systems but had already been rejected by BR. And this was not all. At the time, sanding was out of vogue, but provision for it had been put in (sanding is now *de rigueur* again; the Class 56 freight locomotive carries 8cu ft). And finally, provision was included for weight transfer compensation as well.

Throughout the design, complexity ruled. Inertial air filtration was fitted with electric motors driving the air blower and dust extractor fans. It was the noise of these fans which was to give the Class their first nickname of 'Hoovers'. There was also dynamic braking, which was integrated with the automatic air brake/vacuum train control system. Bearing in mind that these locomotives would spend almost all their working lives on fully-fitted stock the need for dynamic braking was hard to discern — unless BR was worried about the rising cost of brake blocks. And just in case the 100mph thoroughbreds were to be used on merry-go-round coal workings there was pre-set slow-speed-operation mode with separate low-speed and high-speed wheelslip detection systems.

Delivery of the 50 production units to the LMR took place in 1967 and 1968 and the locomotives were based at Crewe depot. Initially, the new locomotives ran single-headed trains, but the new 1970 timetable saw them being used in multiple. Even after allowing for electric train heating this gave 5,000hp at the head, enabling a much more consistent level of performance to be maintained throughout the West Coast Route while electrification was pushed forward. Their introduction resulted in savings of up to an hour from Euston-Glasgow timings. With over 4,000hp at the rail the humbling of Shap and Beattock — to be completed by the even more powerful Class 87 electric locomotives — had begun. Even with 12coaches on, the two climbs could now be made at sustained speeds of over 70mph and elsewhere on the route 100mph running was common.

But the performance was being obtained against a background of rising troubles. Ironically, it was the best-tried part of the locomotive which first caused problems — the engine. As the batch of engines for the class was being built, the production of cylinder heads was moved to another foundry in the English Electric group. And in the process a small flaw crept in. This small crack allowed water from the cooling system to leak into the cylinders after an engine had been shut down. When the engine was turned over again the cylinder concerned was full of an incompressible fluid and something had to give — either the connecting rod bent or the liner failed. At least one engine was completely written off in this way. There were also piston troubles which were traced to the too-effective action of the scraper piston rings. The immediate solution was to remove the scraper rings, which led to the class becoming notorious for its oily exhaust fumes. Subsequently improved pistons and rings were fitted. But despite these problems which were additional to the usual teething troubles of a complex design, the Class 50s earned their keep on the LMR until, with the gradual advance of the catenary, they began to be transferred to the WR.

The first two 50s arrived at Bristol as early as October 1972, but it was not until the completion of electrification in May 1974 that the transfer began in

This picture: *No 50.039 skirts the sandstone cliffs between Teignmouth and Dawlish with the 15.55 Paignton-Paddington on 8 August 1975.*
/ Brian Morrison

Below: *No 50.003 glides westward through Dawlish Warren with a summer Saturday express to the Devon holiday coast on 16 August 1975.*
/ G. W. Morrison

earnest and the WR received 35 of the locomotives over a few weeks; the remaining 15 were kept on the LM until 1976. For the WR, the new locomotives represented potentially, if not actually, a welcome improvement. The Class 52 'Westerns', for all their reputation, were limited to 90mph and the Region's Class 47 fleet to 95mph. Yet the Region had miles of straight and level 100mph track, from London to Wootton Bassett for example.

As the drivers began to exploit the Class 50 potential for sustained high-speed working a new rash of troubles broke out. While 100mph-plus had been common on the LMR it was only possible for short bursts. Now the 50s were wheeling along at the 'ton' for miles on end, and a new type of running brought new problems. Most serious was a rising tide of traction motor failures, at its worst requiring 13 motors a month to be changed. The Class 50 traction motors are virtually identical with those of the Class 37, but because of a design change to improve commutation, the conductors of the armatures on the Class 50 armatures were split. Unfortunately, this also led to the conductors lifting when they were subjected to sustained high-speed running, which caused chafing of the insulation and failure due to short circuits. The long-term solution (also adopted for the Class 55 'Deltic' motors) was to put the split conductor armatures into Class 37 motors and use the solid conductor armatures in the Class 50 traction motors. There were also main generator problems, traced to contamination of the armatures by oil and coolant vented by the turbo-chargers.

As a result of these problems, the 50s got off to an unhappy start on their new Region — to the delight of 'Western' locomotive fans who cruelly dubbed them 'fifty/fifties'. This was not far from the truth as the availability of the class was about two-thirds that of the WR Class 47s. However, the WR engineers had a powerful incentive to get the 50s right, for they were a long-term part of the Region's fleet, not a stop-gap as on the LMR, which would still be needed after HST services began. They also offered more power than a Class 47, plus 100mph. So by 1978 a programme had been instituted to turn the 50s into a reliable high-performance locomotive. In some cases this is taking the form of official recognition of improvements carried out by the WR engineers over the years. For example, the dynamic braking can be permanently locked out, leaving one less system to go wrong. Similarly, the locomotive can manage quite well without one of its two wheel-slip systems. At the same time, BR's own electronics team at the Railway Technical Centre, Derby has developed a new load regulator to replace the original KV10 system in the locomotives and this was beginning prototype trials in a Class 50 at the start of 1978. All this work is improving the reliability of the class, which at the time of writing is on a par with that of the Class 47s. Other changes will be concerned with improving maintainability. As the engineers responsible will testify, the Class 50 is not the easiest locomotive to maintain and changes here will both reduce the work-load on the depots and improve availability. Even so, at the time of writing, there was a marked reluctance to talk about the improvement programme in detail. The Class 50s, it seems, remain political locomotives.

Yet throughout their troubled career, the locomotives have consistently shown the virtues which they inherited from DP2: the ability to run fast, work hard and put up high mileages on express passenger services. When 'Inter-City 125' services on the WR started with a reduced HST fleet, the Class 50s were drafted in as substitute HSTs hauling limited (eight-coach) trains, and proved capable of average speeds in the high 80s. Perhaps the best indicator of intensity of this working can be seen in the annual mileages of the Class 50 locomotives. In 1977 this was about 104,000 miles; the BR average was just under 56,000 miles. Hard work like this will make up for many shortcomings.

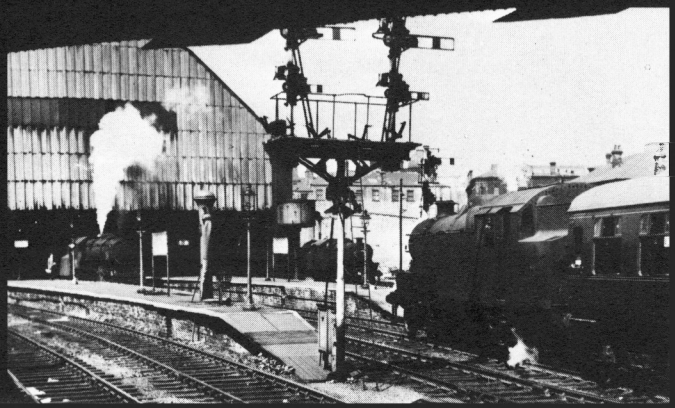
But how much more effective would the class have been if the design had followed that of the similar units supplied by English Electric to Portuguese Railways. These were 5tons lighter, 8ft shorter over the body and their only auxiliary electric motors were the two driving the exhausters. True, the diesel engines and traction motors would still have given trouble, but many of the other problems would have been avoided and the Class 50s, instead of becoming very good locomotives, could have been the greatest to emerge from the Modernisation Plan.

Super power on the Western: Nos 50.023 and 50.045 double-head the 14.30 Paddington-Paignton past Ufton Crossing, Berkshire, on 22 April 1976. / D. E. Canning

Exchange into Interchange

Transformation at Bradford

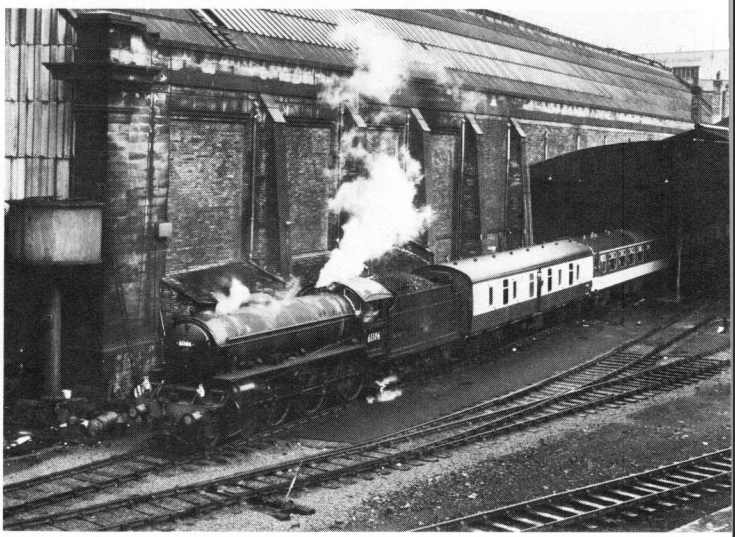
Above: *Bradford's Exchange station was originally the Lancashire & Yorkshire Railway's terminus in the city. The four-track station was inadequate for traffic from the start and it was comprehensively enlarged to ten platforms under a distinctive double-arched roof with fan-framed glazing in 1888. At the same time the approaches were widened out to Mill Lane Junction. Latterly, with the great roof bereft of glass, it was a bleak place, as this July 1970 picture shows.* / M. Dunnett

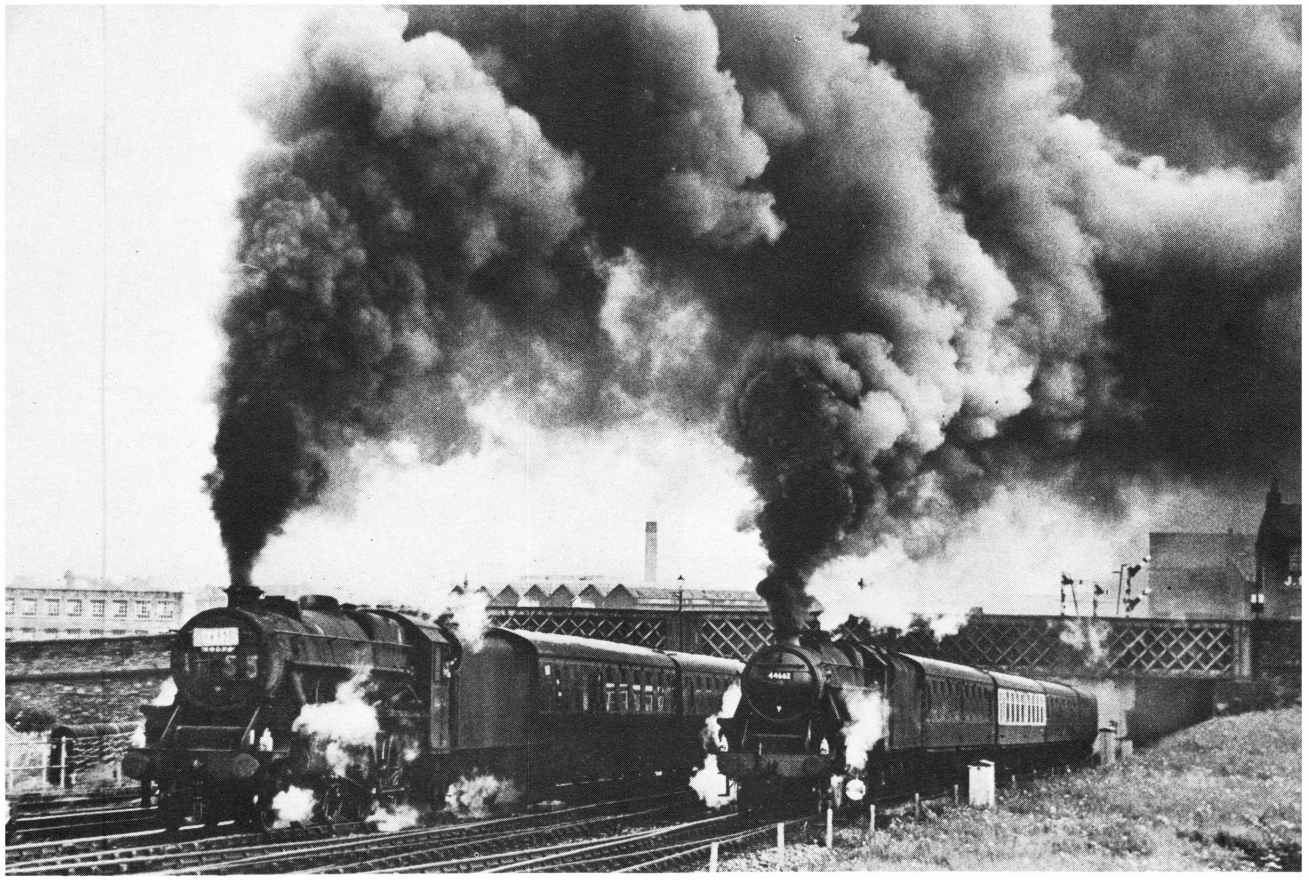


Centre right: *The station is approached on a 1 in 50 gradient, down which Class 4 2-6-4T No 42073 makes a cautious approach with through coaches from off the 07.45 from Kings Cross, which it has ferried over from Leeds on 2 June 1966.* / M. Dunnett

Bottom right: *Another view of the approaches to Bradford Exchange in the final years of steam as Class 4 2-6-4T No 42073 picks out its path into the platform with a train from Yarmouth on 2 July 1966.* / M. Dunnett

61306





Above left: *The cavernous interior of Bradford Exchange: on its last duty before withdrawal, Class B1 4-6-0 No 61306 awaits the rightaway with the 22.00 parcels for Huddersfield on 30 September 1967.*/ J. B. Mounsey

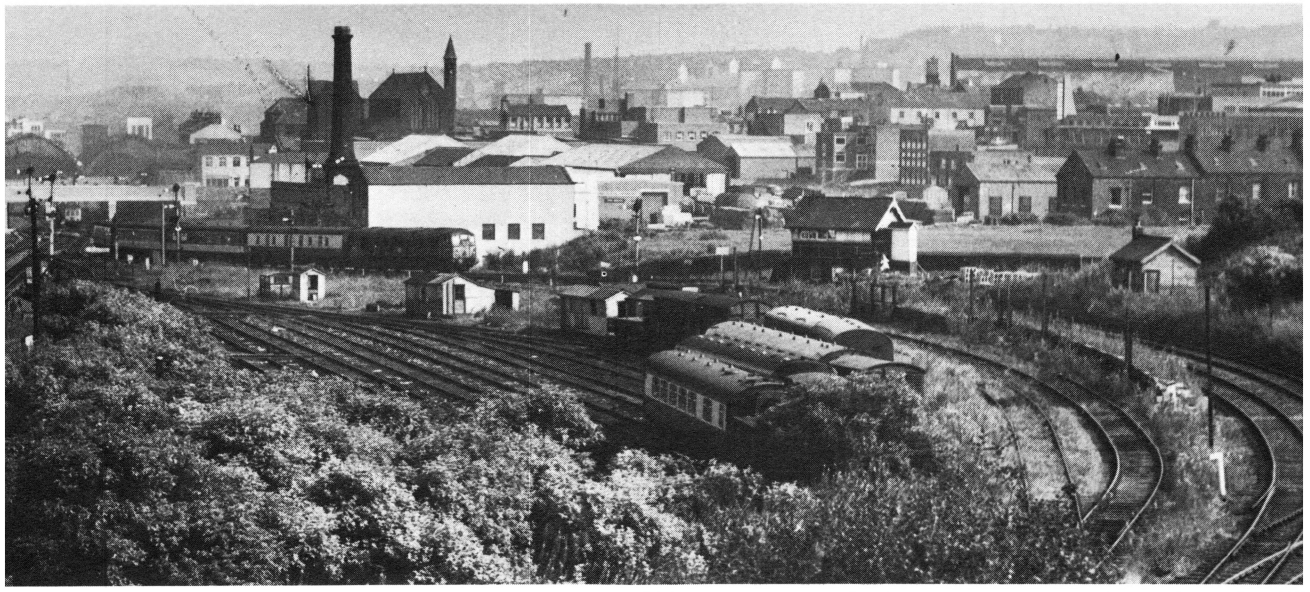
Left: *Another view of No 61306 earlier that same September 1967 day, simmering in the sidings alongside Bradford Exchange with stock — including, unusually, a Pullman — to form the 09.55 through section of a Leeds-Kings Cross express.* / J. B. Mounsey

Far left: *One of the many summer Saturday through trains to coastal resorts, the 09.06SO to Poole, leaving Bradford Exchange behind Class 5 4-6-0 No 45208 on 2 September 1967.* / M. J. Fox

Above: *Two Class 5 4-6-0s, Nos 44694 and 44662, hammer away at the 1 in 50 up to Mill Lane Junction on simultaneous summer Saturday departures at 08.20 from Bradford Exchange to Skegness and Bridlington. The left-hand Skegness train will take the straight route ahead to Low Moor, while the Bridlington train will curve away at Mill Lane Junction for the Leeds route via Laisterdyke.* / V. C. K. Allen

Right: *The 07.48 Bradford-Skegness on 1 August 1964 is making for Leeds to pick up more coaches there. Class B1 4-6-0s Nos 61014* Oribi *and 61240 are near the end of the grinding climb out of Exchange, taking the Cutlers Junction/Adwalton Junction fork at Laisterdyke East Junction to make for Pudsey.* / M. Mitchell

KINGS CROSS CABIN



Left: *The Mill Lane Junction area of the exit from Bradford Exchange (the roof of which is partially obscured by the telegraph pole in the left foreground) photographed in the mid-1950s. BR standard Class 5 4-6-0 No 73044 is heading empty stock past Coal Shoots Yard box.* / K. Field

Below left: *The same scene on 26 August 1967 and rationalisation has begun: Coal Shoots Yard box has been demolished and two crossovers have been removed. Class 4 2-6-4T No 42152 is storming the bank and heading for Low Moor with the 09.06SO Bradford Exchange-Poole.* / M. Dunnett

Above: *The camera veers right to focus on the St Dunstans curve taking the Pudsey-Leeds route round from Mill Lane Junction to Laisterdyke, as a Class 24 diesel grumbles up the bank with the Bradford portion of the London-bound 'Yorkshire Pullman' in August 1970.* / M. Dunnett

Right: *Close-up of St Dunstans Curve on 14 July 1976: note that the yard enclosed in the fork has been eliminated. The 11.55 Bradford-Kings Cross is headed by diesel No 31.417.* / G. W. Morrison

Above left: *The approach to Bradford in the late 1970s: No 47.549 eases the Sunday 10.10 from Kings Cross past Laisterdyke East Junction on 10 October 1976.* / C. R. Davis

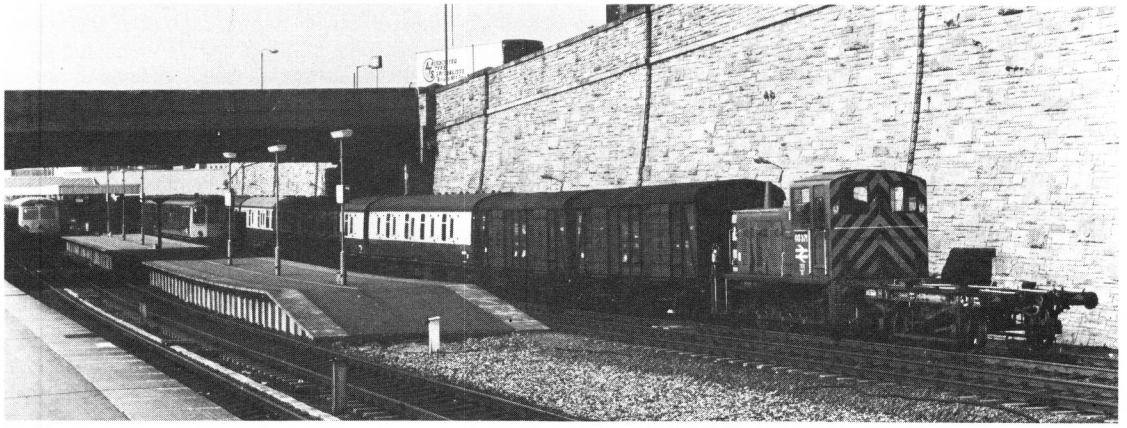
Above right: *No 47.551 negotiates the sharp bend from St Dunstans round to Hammerton Street Junction with the 10.05 Bradford-Kings Cross on 18 July 1976.* / G. W. Morrison

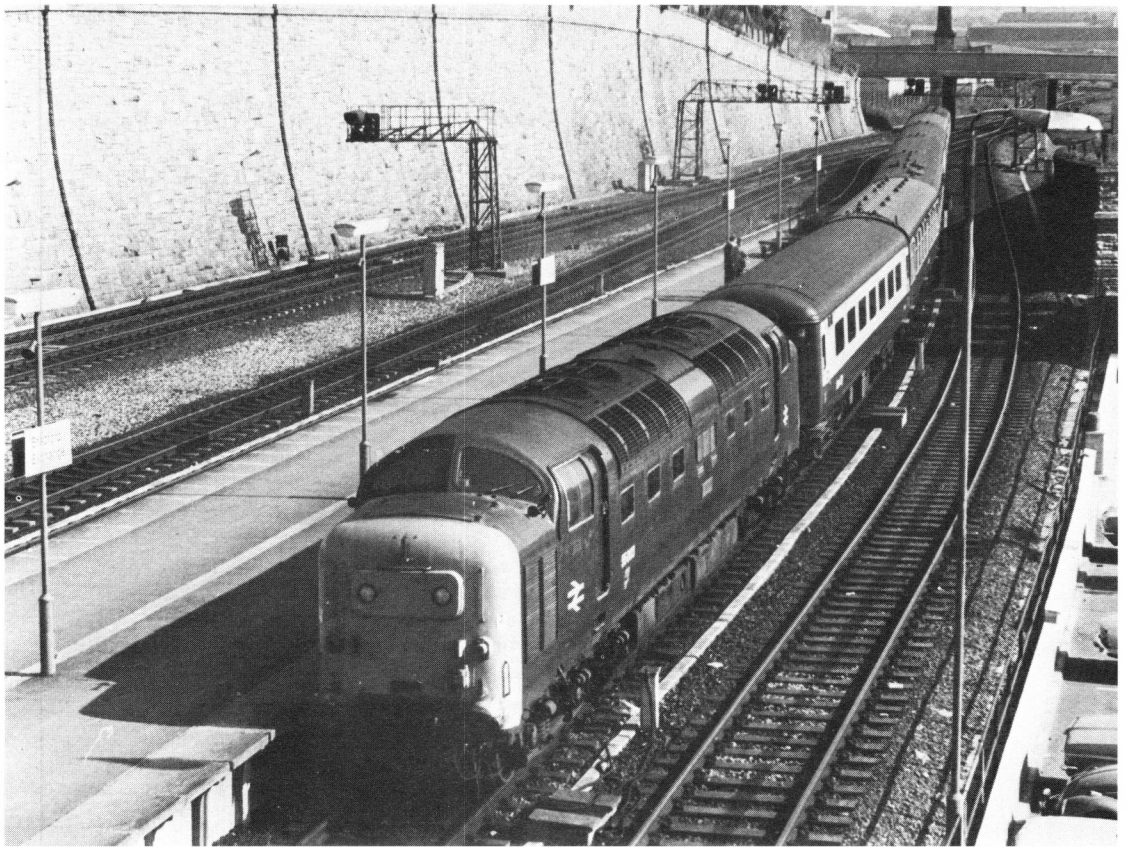
Below: *Compare this view of the drastically rationalised Mill Lane Junction layout, taken on 5 July 1977, with the pictures of ten and twenty years earlier on the preceding pages. A hybrid Metro-Cammell/Birmingham RCW dmu has descended the bank from Low Moor on a service from Manchester via the Calder Valley and is heading for the new Bradford Travel Interchange.* / J. G. Glover

Centre right: *The platforms of the new Bradford Exchange station on 5 July 1977, with diesel shunter No 03.371 busy in the parcels bay.* / J. G. Glover

Bottom right: *One of the few locomotive-hauled workings that Bradford Exchange sees today — arrival of the 13.08 from Kings Cross behind 'Deltic' No 55.003* Meld *on 5 July 1977.* / J. G. Glover

Left: *Bradford City Council had planned before World War II to endow the city with a new central bus station. In the late 1960s the concept was enlarged to that of a custom-built road-rail interchange. Other circumstances now combined to persuade the Council and BR to close the old Exchange station and build a new complex to the south, beyond the Bridge Street road bridge that spanned the throat of Exchange station, with the bus facility occupying the site of a former goods yard alongside. The railway station was ready for use in 1973, but the bus station and its semi-basement garage were not ready until the spring of 1977. This was the passengers' approach to the new Bradford Travel Interchange soon after its completion on 5 July 1977.*
/ J. G. Glover





The 160mph TGV Sud-Est

The French build the World's fastest railway from Paris to Lyons

MARCUS NEWMAN

By the early 1980s Western Europe will have fully regained the crown of the world rail speed kingdom. Under overhead wires, French Railways run the Japanese National Railways' Shinkansen end-to-end schedules quite close with one or two of their top-rank *rapides* and TEEs. With miles of the Paris-Bordeaux route operable at 125mph, for example, the 'Etendard' and 'Aquitaine' cover the 363miles between the two cities in 230min non-stop for a throughout average of 94.7mph, despite having to negotiate some unfriendly terrain through the hills which flank the rivers flowing down from the Massif Central to the Atlantic coast. On the combined counts of speed and frequency, though, it is surprisingly with diesel traction that Western Europe has so far produced the keenest competitor for the Japanese, in British Rail's Inter-City 125 service with HST train-sets between Paddington, Bristol and South Wales, with its 31 daily start-to-stop times in excess of 95mph, climaxing in four at 103mph. By the end of 1983, however, the French are set to sweep well ahead, not only of BR's HSTs but also of the Japanese Shinkansen, on a brand-new railway they are now building from Paris south-eastward to Lyons.

The French jumped into the European rail speed lead after World War II and in terms of numbers of daily runs timed at 70mph and more start to stop have stayed there ever since. In part this is because wartime devastation of the railways gave them an opportunity denied British Rail to electrify while rebuilding. But French Railways also have geophysical advantages compared with BR. The upper half of the country is very largely flat farmland, where large towns and cities are for the most part widely dispersed. Where the terrain is rough and hilly, major population centres are still sparser on the ground. Commercial life radiates from the capital city to an even greater extent than in Britain, so that there are fewer key lateral lines of communication in the provinces.

All this means that several of the trunk rail routes from Paris are far less encumbered with busy junctions than BR's and enjoy much longer stretches of straight or at worst gently curving track. When French Railways electrified they built into their locomotives a high reserve of power with which to exploit these conditions in the flatlands and to take the grades through the hills in almost untroubled stride. Thus, for instance, the 361 miles from Paris to Bordeaux have been covered start to stop by a test train of conventional locomotive and coaching stock, devoid of any body-tilting or other special suspension devices, in 213min at an average of 101.7mph without speed anywhere exceeding 112mph. Today's timetabled average speed of the 'Etendard' and 'Aquitaine' over this route is only some 10mph slower than the computer-predicted practicable service timing of a one-power car British Rail APT for the 392.8 miles from Kings Cross to Edinburgh.

One should add that another factor in French Railways' high average inter-city speeds is their long-established practice of 'flighting' in their timetable planning: that is, grouping trains of similar speed ranges from one section to another to the maximum extent possible, so that a sequence of similarly-paced *rapides* can tail each other over a stretch of main line without interruption from secondary passenger or freight train. The Western Region of BR has perforce to apply the same principles to the double-track sections of its Paddington-Swindon main line in order to protect its standard Inter-City 125 schedules.

The principal French Railways' main line is that from Paris southeastward to Dijon and Lyons, which debouches into routes onward to Marseilles, the Riviera, Switzerland and Italy. It connects no less than 40 per cent of France's entire population and not unnaturally was the first choice for post-war electrification. Since 1960 its traffic of all kinds has increased annually by about 3.5 per cent, a higher figure than for any other French Railways' trunk route. It is largely four-track, but there are some significant double-track sections in country where enlargement of capacity would be expensive.

French Railways reckoned that if Paris-Dijon-Lyons maintained this expansion rate, by 1980 those double-track bottlenecks would have to cope with a daily average of 150 through trains of all kinds each way. That volume would seriously hamper timetable 'flighting' and thus frustrate further acceleration of inter-city and international expresses on this commercially key route, subject to both *autoroute* and air competition. *Banalisation* — ie, extension of bi-directional signalling and operation with related crossover loops between the main running lines — would not create sufficient operational flexibility to solve the problem. Anyway, the Paris-Dijon-Lyons main line was not so well contoured as some other French routes for extensive adaptation to 125mph, so that the limits of its potential were in sight on more than one count.

Late in 1969, therefore, French Railways submitted

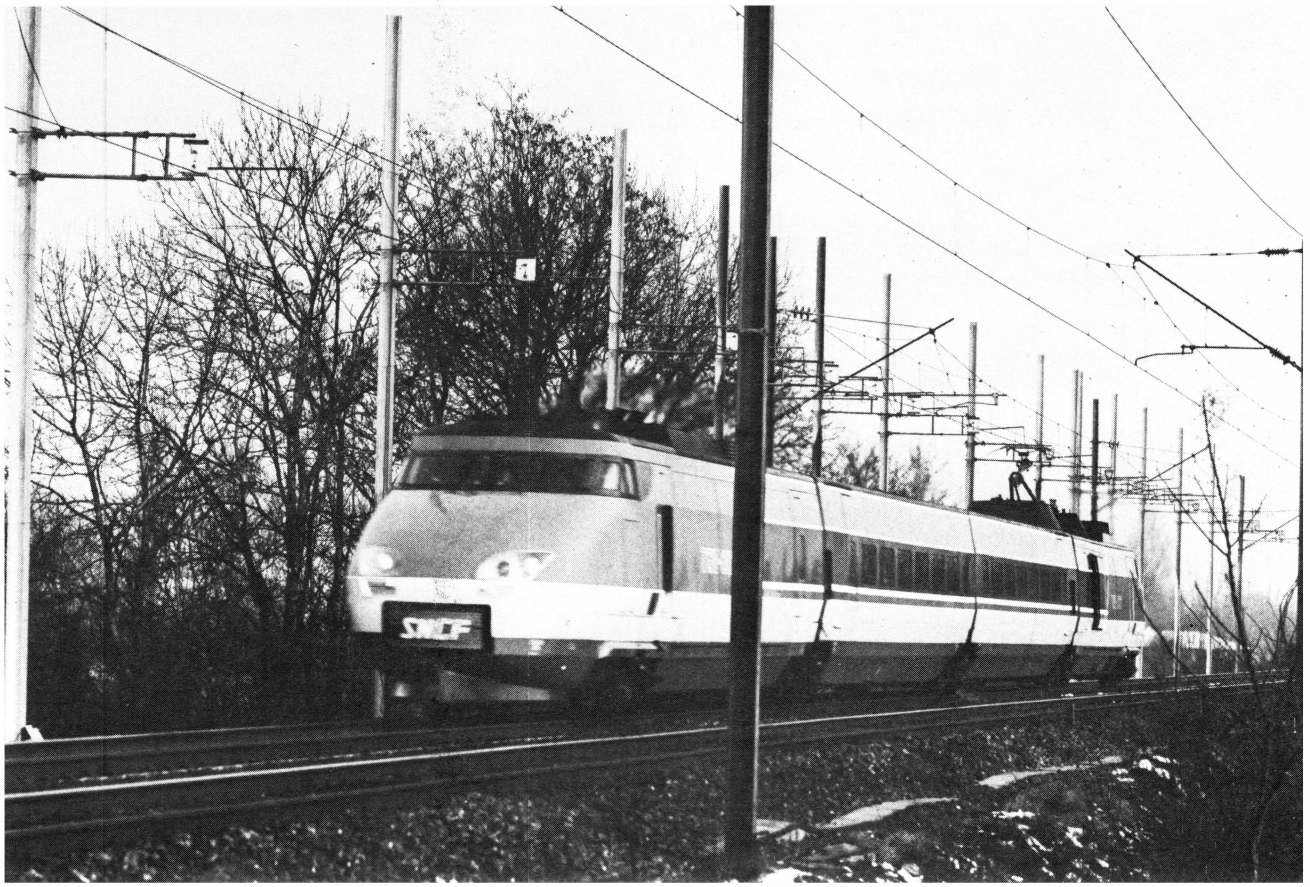
to their Government a project for a brand-new high-speed railway from Paris to Lyons. It was to be an exclusively passenger line, to relieve the existing route of the latter's long-haul traffic to and from Marseilles, the Riviera and neighbouring countries. This would amount to as much as 70 per cent of all traffic, so that the old route would have a great deal of scope to improve and accelerate its substantial freight flows to the benefit of the country's commerce and industry if the new railway were approved.

A cardinal point of the new railway plan was that, unlike the Japanese Shinkansen, it must be compatible with the existing French Railways' network. Through running beyond the limits of the Paris-Sudest, as the new route is known, must be possible and free of operational complication.

Compatability had another very important economic point. It would enable use of existing rail infrastructure in the terminal cities, avoiding the horrendous costs of building a new railway in an urban environment which the Japanese encountered, and which British Rail faced but the British Government would not entertain in the abortive plan for a new line from the Channel Tunnel to the heart of London. Once beyond the Paris and Lyons outskirts, it was comparatively easy to plot a comfortable line of route through the great expanses of French countryside that would steer clear of towns and villages — far more so than, say, in Britain. It was still less of a problem when modern electric traction's ability to romp up steep gradients was taken into account. The main difficulty confronted by French Railways was the implacable opposition of the politically powerful French farmers to this desecration of their treasured land. Joining hands with environmentalists, automobile and road transport industry interests and the airlines, they fought so long and virulently against the project that the highest council of the French state had eventually to pronounce judgement.

Had there been a Channel Tunnel, the French would have demonstrated a remarkably economical way to build a new railway, given the characteristics of modern traction and running gear. Upon completion of the Paris-Sudest line, French Railways intended to press for construction of a second new high-speed line from Paris to Lille and the Belgian and West German borders, with a branch to the Channel Tunnel. With a new *autoroute* planned from Paris to Lille, the two thoroughfares would have been combined in one approximately 240ft-wide infrastructure. That would

The turbine-powered TGV train-set prototype, TGV.001, which has made well over 200 test runs in excess of 150mph, up to a maximum of 197mph. The pantograph it carries here is under test, and not providing traction power; the trials were taking place between Colmar and Mulhouse. / French Railways

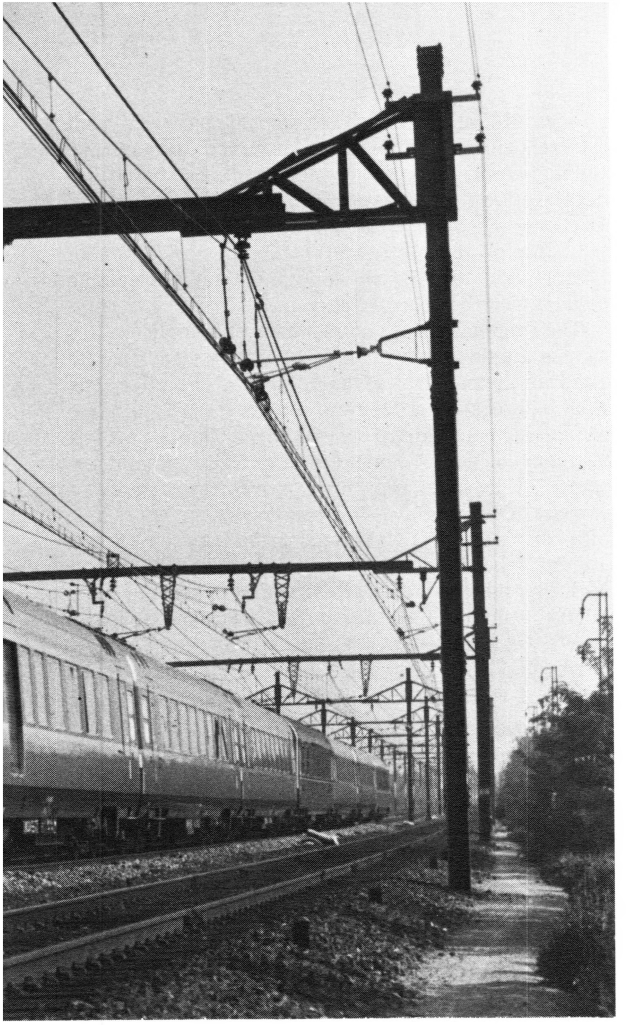


have cut the construction costs of road and railway respectively by about 10 per cent.

New railway and *autoroute* would have been segregated by a median strip of some 100ft, on the one hand to keep train drivers well clear of headlight glare from road vehicles, and on the other to protect road traffic from the turbulence set up by high-speed trains. The companionship of the railway would have enforced some restraint on the curvature of the *autoroute*, but little on its gradients. The normal maximum for a motorway is about 1 in 25. French Railways were quite happy with gradients as steep as 1 in 28½ in short stretches, so that the combined infrastructure could by and large follow the contours of the terrain as they came, without excessive embankment, cutting or bridging, and not have to deviate in search of valleys. The engineers would have to be careful, though, to avoid very sharply tapered summits at the top of the steepest grades, to avoid trains momentarily 'taking off'; in general, the maximum vertical curve allowed in such situations at the high speeds envisaged is 17,500yds radius. If this railway to the north is ever built, and with it the Channel Tunnel and a suitable new link from the English Coast to London, then the British and French capital cities would be brought within a mere 2¾hr rail travel time of each other.

An *autoroute* was already in being from Paris to Lyons, so an independent line of route had to be charted for most of the Paris-Sudest railway. For the first 18¾ miles Paris-Sudest trains will take the existing main line out of Paris Gare de Lyon. Then, at Comble-Ville, the new route strikes out over 220 miles on its own until it rejoins the existing network 5 miles out of Lyons for its final run into the centre of that city. French Railways' surveyors managed to strike a path for the new railway that keeps it well clear of all towns, historic monuments and scenic treasures; it does not even come closer to the smallest hamlet than about 800ft.

In the whole of this new railway there will be just two intermediate stations — at Montchanin, to serve



France's fastest train in the mid-1970s, the 'Etendard', timed to average 94.7mph over the 363 miles from Paris to Bordeaux non-stop; fronting the rake of Grand Confort *coaches is 8,000hp No CC6524.* / Y. Broncard

the neighbouring industrial centre of Le Creusot, and at the wine-growing centre of Macon. Macon is also the location of one of the only two junctions in the 220 miles of new line. Through trains to the French Alps of Savoie and Geneva, for southern Switzerland, will diverge here in a flying junction. Trains for Dijon, Belfort, the Jura region and north-west Switzerland will break away earlier in the journey from Paris, using flying junctions at Pasilly and Aisy, south-east of Auxerre.

The 220 miles of new route are being laid out for a maximum speed of 300kmph (187.5mph), though initially the railway will be operated at a maximum of 260kmph (162.5mph). The route will be laid out with little more regard for gradients and curvature than a motorway, with slopes briefly as steep as 1 in 30 and curves of 3,500yd minimum radius, which will be canted for comfortable negotiation by the Paris-Sudest trains-sets at top speed. The only speed restriction in the entire 220 miles will be to 136mph at the crown of a gable in the Burgundy hills, where the horizontal radius of the summit has to be 13,000yd radius, about 25 per cent sharper than the figure tolerable at top speed. Track will be of standard pattern, on concrete sleepers. French Railways reckon that the new line will be built for two-thirds of the cost of an *autoroute* over the same terrain and distance, and for less than a fifth of the cost per mile of Japan's New Tokaido line (at contant money value, that is).

Since 1972 the prospective running gear and suspension of the Paris-Sudest train-sets have been evaluated in a four-car gas turbine-powere test set, No TGV001. Well over 200 outings with this unit have been at speeds in excess of 150mph, up to 197mph, and the export-hungry French — in sharp contrast to British Rail with their APT prototype — have lost no opportunity of taking visiting railroad executives and influential politicians from abroad for a high speed jaunt in the set. Amongst other things, the tests with TGV001 have convinced the French that 185mph trains passing each other in tunnel will set up no awkward effects, given the distance of just over 13ft between running lines predicated throughout the high-speed mileage of the Paris-Sudest.

For a long time French Railways argued internally over the choice of gas turbine or electric traction for the Paris-Sudest. In the early days the odds were on turbine power because of its fuel economy and the anticipated problems of efficient current collection from overhead wires at the extremely high speeds envisaged. But the explosion of oil prices nullified the fuel advantage and protracted pantograph tests with a C-C electric locomotive in Alsace at speeds up to 175mph convinced the French that the current collection problem could be licked.

Two pre-production prototypes and 85 production series train-sets for the Paris-Sudest were ordered almost simultaneously with the start of the route's civil engineering at the end of 1976. Each train-set will be double-ended, with two streamlined power cars, each independently bogied, enclosing eight passenger cars articulated throughout as a single unit. This high degree of articulation was adopted to save weight and energy and to enhance passenger comfort by keeping seats away from bogies and creating a more stable platform for inter-car communication.

Each train-set will have six motored bogies, two on each power car and one at each end of the eight-car articulated passenger unit (the last two will be beneath non-passenger accommodation). Total output from all six bogies will be 6,300kW, the equivalent of about 8,400hp, so that each unit will pack a substantial reserve against failure of one of its power packs.

Construction of the TGV Paris-Sudest begins: the way the trackbed-to-be disappears beyond the crest in the background emphasises the sharpness of the gradients — this is the summit of a 1 in 30 stretch at Tintry, north of Le Creusot. / Y. Broncard

The first batch of Paris-Sudest train-sets will be dual-voltage: 1.5kVdc for the exit from Paris to Comb-le-Ville and onwards from Lyons since the existing main line is electrified on that system, and 25kV ac for the new line. The 85 production-series units are due for first deliveries at the end of 1979. By October 1981 a squadron of 40 should be available to begin operation, at first over the existing Paris-Lyons main line. Later train-sets intended to work out of French Railways territory into Switzerland will be triple-voltage.

Alone among European railways, the French are applying airline-style catering widely to their internal inter-city train services, limiting traditional multi-course, full meal service to TEEs and a few exclusive *rapides*. Unlike British Rail's HSTs and APTs, therefore, a Paris-Sudest train-set's catering equipment will be two airliner-style galleys to resuscitate pre-prepared tray meals for service to passengers at the 108 first- and 264 second-class seats in each unit.

The Paris-Sudest will be the professional railway operator's dream. With only a couple of junctions and two stations in the new mileage, there will be no more than 10 possible routings to set up for trains once they have entered the new railway proper. The whole of the new mileage can therefore be comfortably controlled from a single centre.

Split up into 3,300yd block sections, the route will be organised for bi-directional running on each track throughout with crossovers every 12-15 miles (the French are evolving extraordinarily long turnouts capable of negotiation at 135mph). The trains will be governed by speed-control cab signalling, derived from low-frequency ac impulses transmitted through the running rails, and the system will be based on deceleration by stages from the maximum of 187.5mph through 270kmph (168.8mph), 220kmph (137.5mph) and 160kmph (100mph) to a stand. Drivers will also be in continuous radio-telephone contact with the control centre.

The originally programmed date of completion has slipped a little and at the time of writing stands at late 1983 for introduction of the full timetable service. The French forecast that they will run the Paris-Sudest like a long-distance Metro in the peak hours, with a headway of just 4-5min between trains despite the speeds in prospect and thus a movement capacity of some 12,000 long-distance passengers an hour. The off-peak frequency is expected to be between 15 and 30min; in all the timetable will probably show around 50 trains each way daily. Reservation of seats in Paris Sudest trains will be *de rigueur*; no standing passengers will be allowed.

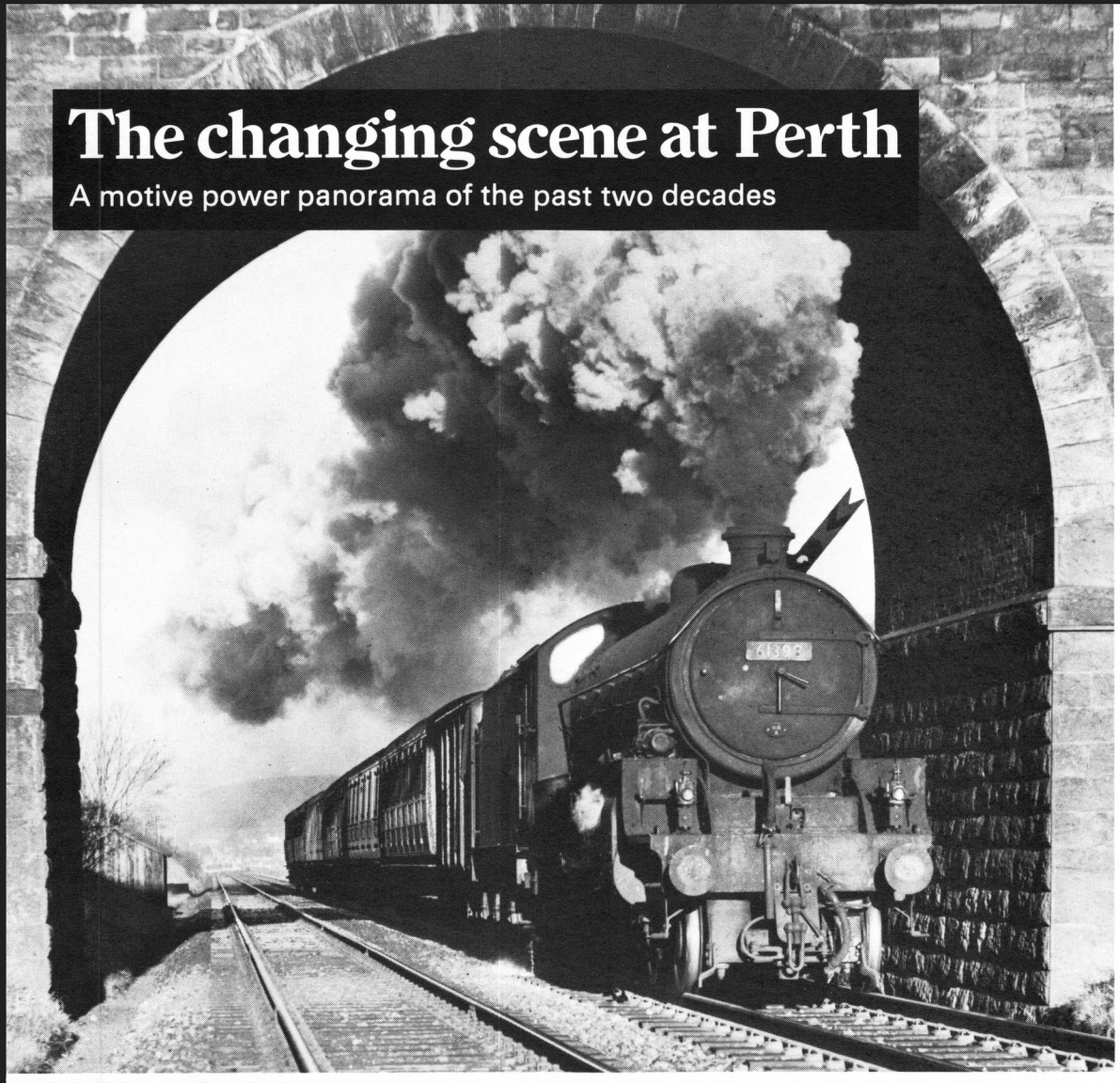
Needless to say, the standard journey times predicted when the Paris-Sudest becomes operational are spectacular. The new route will trace a less circuitous line than the old one, so that the Paris-Lyons distance will contract from 512 to 425km (265.5 miles); that will be covered in a non-stop time of two hours flat (average 132.25mph), compared with a best of 3hr 44min via the old route at the time of writing. Specimens of other end-to-end transit times from Paris likely to be on offer via the Paris-Sudest are (present best schedules in brackets): Avignon 3hr 49min (5hr 40min), Lausanne 3hr 29min (4hr 39min), Geneva 3hr 14min (5hr 40min) and Marseilles 4hr 43min (6hr 35min).

With construction of the Paris-Sudest barely begun, French Railways were asked in the spring of 1977 to start studies of a second high-speed route. Not, unhappily, the TGV Nord which, even without a Channel Tunnel, would have quickened Britons' surface journeys between London and Paris, but a line from Paris north-westwards to Brest, Nantes and La Roche-sur-Yon. This project, the TGV Atlantique, is envisaged as much more a revamp of existing railway than the Paris-Sudest. The plan foresees new infrastructure only from the Paris area to Tours or Le Mans, and upgrading of existing track beyond either point. Emphatically, no sods would be turned on this new project until the Paris-Sudest was completed.

All this makes an exhilarating prospect. The only thing to mystify the envious Briton is how French Railways, already bolstered by some £2,000million a year in grant-aid, compensation and subsidy from the State and other public authorities, can still persuade their Government to pump such huge sums into a gargantuan project like the Paris-Sudest.

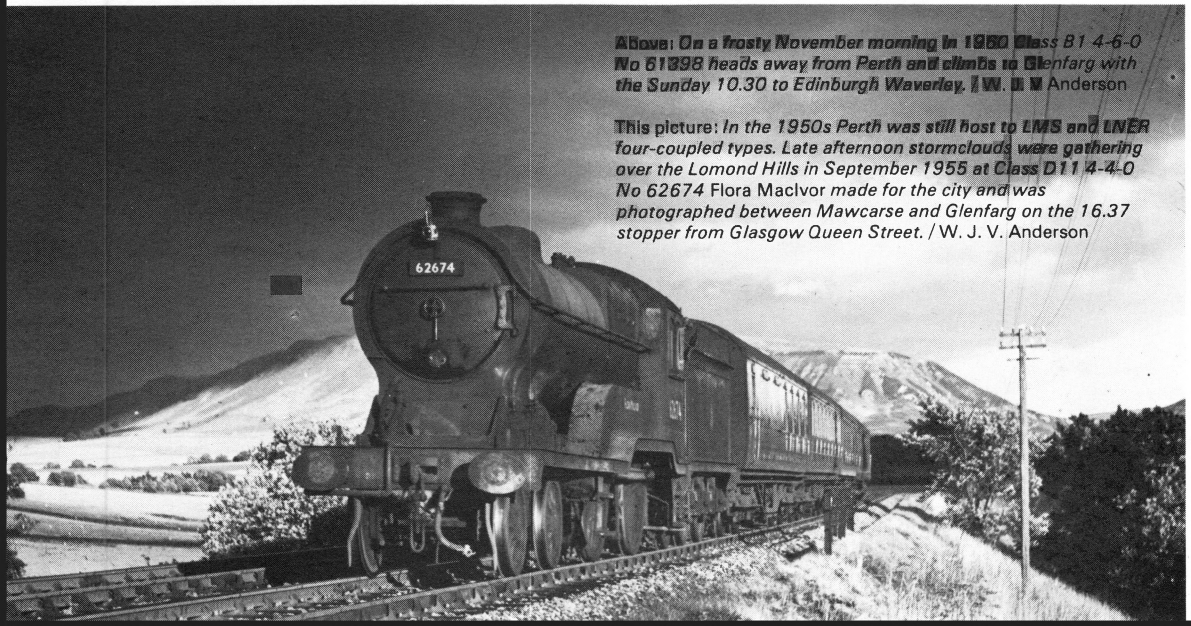
The changing scene at Perth

A motive power panorama of the past two decades



Above: *On a frosty November morning in 1960 Class B1 4-6-0 No 61398 heads away from Perth and climbs to Glenfarg with the Sunday 10.30 to Edinburgh Waverley.* / W. J. V. Anderson

This picture: *In the 1950s Perth was still host to LMS and LNER four-coupled types. Late afternoon stormclouds were gathering over the Lomond Hills in September 1955 at Class D11 4-4-0 No 62674* Flora MacIvor *made for the city and was photographed between Mawcarse and Glenfarg on the 16.37 stopper from Glasgow Queen Street.* / W. J. V. Anderson

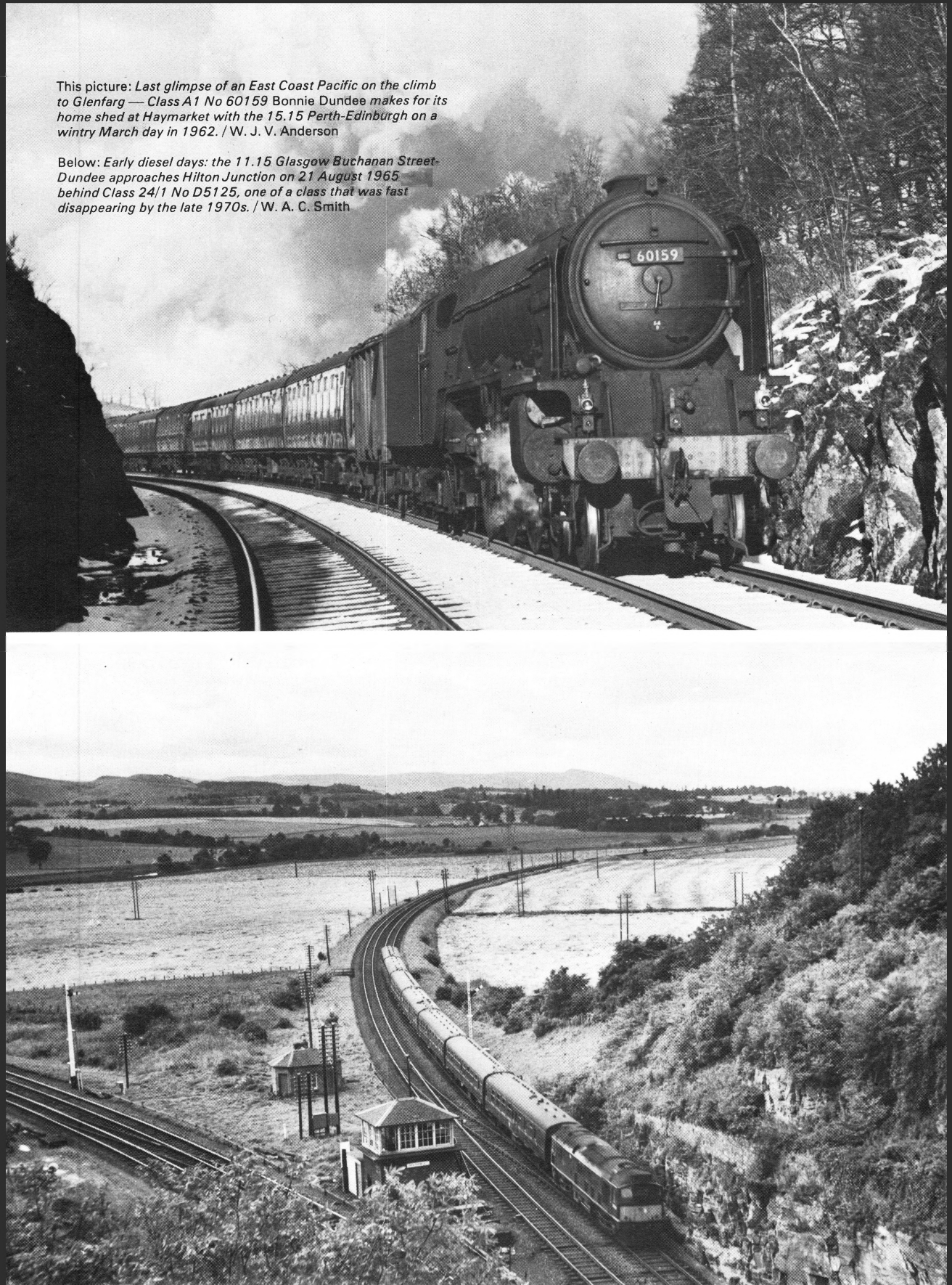


In the 1950s and 1960s Perth was a meeting-place of the biggest LMS and LNER steam power. This superb action photo captures Stanier Pacific No 46241 City of Edinburgh *gathering speed away from Hilton Junction, divergence of Edinburgh and Glasgow routes south of the city, with the 20.50 to Euston.* / W. J. V. Anderson

1921
46241

Above: *Ex-LNER Pacific on the Edinburgh route — Class A2 4-6-2 No 60536* Trimbush *tackles the climb to Glenfarg with the 12.05 from Perth in November 1960.* / W. J. V. Anderson

This picture: *Enter a BR standard Pacific — Class 6 4-6-2 No 72005* Clan Macgregor *comes off the Stirling line at Hilton Junction on its way into Perth with a parcels train from Carlisle on 5 June 1964.* / A. R. Thompson



This picture: *Last glimpse of an East Coast Pacific on the climb to Glenfarg — Class A1 No 60159* Bonnie Dundee *makes for its home shed at Haymarket with the 15.15 Perth-Edinburgh on a wintry March day in 1962.* / W. J. V. Anderson

Below: *Early diesel days: the 11.15 Glasgow Buchanan Street-Dundee approaches Hilton Junction on 21 August 1965 behind Class 24/1 No D5125, one of a class that was fast disappearing by the late 1970s.* / W. A. C. Smith

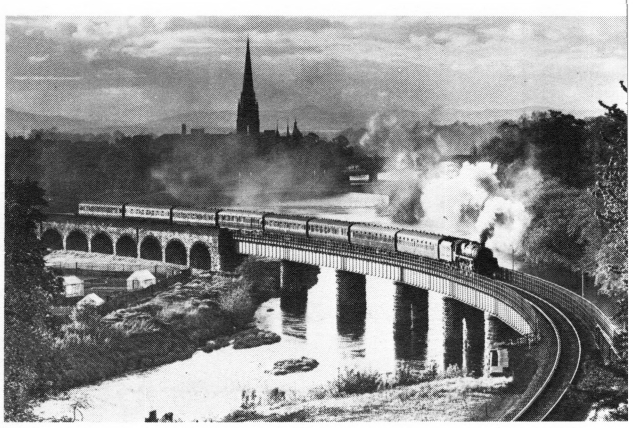
Above: *Early evening steam action at the south end of Perth station on 20 April 1963. In the background Class V2 2-6-2 No 60892 has the blower going as it comes up to departure time for the 17.30 Aberdeen-Glasgow; in the foreground Class A4 Pacific No 60004* William Whitelaw *has coupled on to the London car-sleeper, then running to the Holloway terminal outside Kings Cross and using the double-deck 'Covered Wagons' as car-carriers (one can be seen at the head of the train).* / L. Sandler

Below left: *On 30 August 1964 Class V2 2-6-2 No 60919 brings the Sunday 09.25 Dundee-Glasgow gently into the curving Dundee line platforms of Perth station.* / M. York

Above right: *Fishy business: late afternoon arrival at Perth in April 1964 of the 14.30 fish from Aberdeen behind Class V2 2-6-2 No 60970, which Class 7 4-6-2 No 70009* Alfred the Great, *on the right, is waiting to take on to the south.* / W. J. V. Anderson

Below right: *On a July evening in 1964 a BR standard Class 5 4-6-0 with Caprotti valve gear sets out from Perth across the Tay with a Glasgow-Dundee train.* / W. J. V. Anderson

Right: *Dawn of the diesel age: left is the 'Grampian' en route from Aberdeen to Glasgow behind one of the luckless NBL Type 2 diesel-electrics, No 6123, on 15 June 1965, and on the right a dmu from Edinburgh entering the Dundee line platforms.* / C. T. Gifford



60970
70009

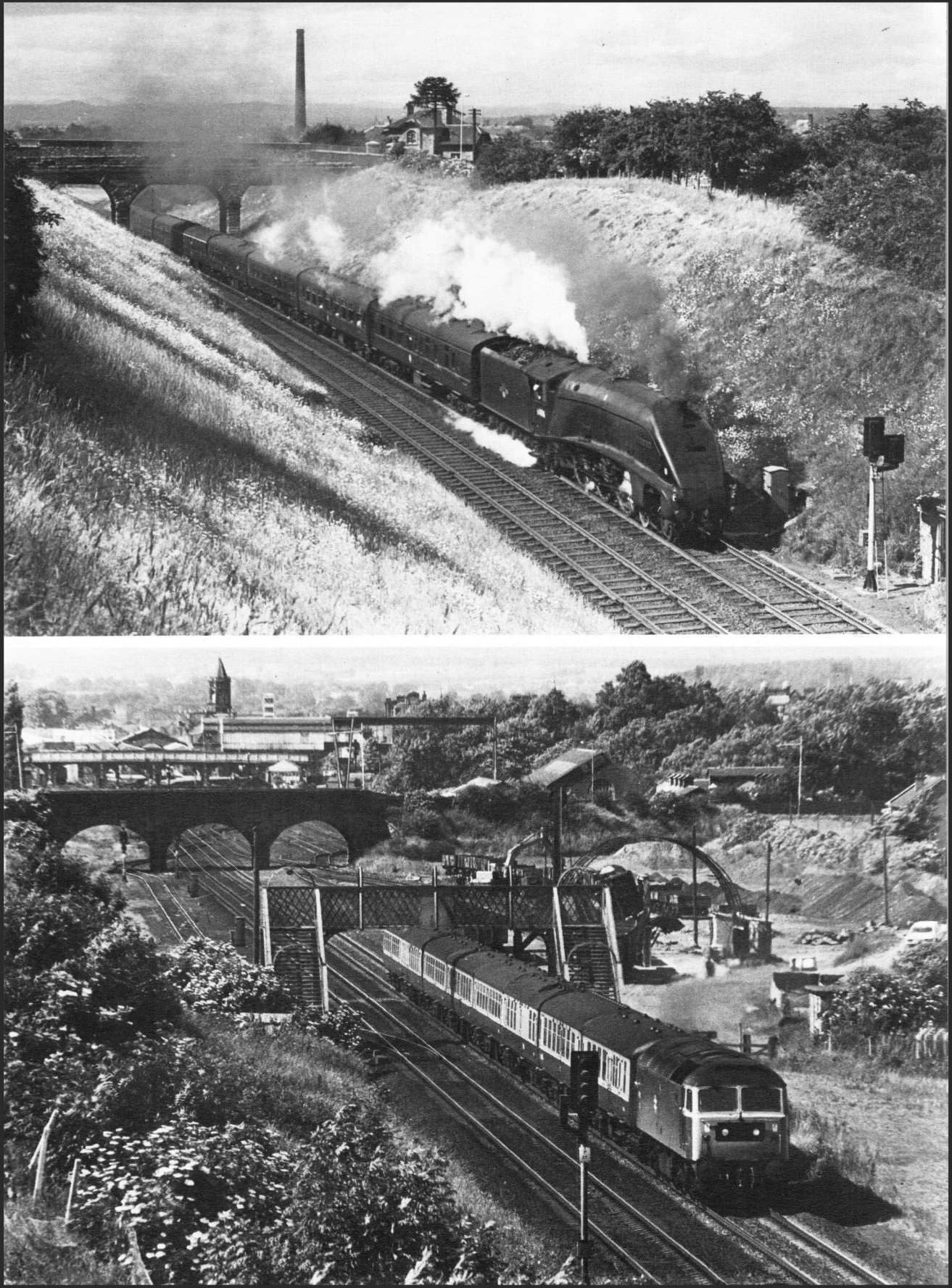
PERTH

This picture: *In the days before centrally-controlled multiple-aspect signalling had been applied to the Perth layout, on 15 August 1959, Caprotti valve gear Class 5 4-6-0 No 73152 sets out from the southern end of Perth station with the 19.22 to Glasgow Buchanan Street, passing Class B1 4-6-0 No 61081.* / J. C. Beckett

Below: *Five years later, on 20 July 1964, the layout has been resignalled; another Caprotti Class 5, No 73150, winds past with the 13.15 from Glasgow Buchanan Street over to the Dundee line platforms of the station.* / S. Rickard

Above: *Panorama of the southern approach to the station on 1 June 1966, as Class B1 4-6-0 No 61102 begins a cumbersome manoeuvre with the 14.50 freight from Dundee; it is about to run round the train in Friarton sidings, then propel it through the station to the mechanised hump yards on the other side — a yard that was one of the particularly ill-advised extravagances of BR's 1965 Modernisation Plan.* / C. W. [illegible]rwman

This picture: *Traffic that is no more* (see page 29)*: roller-bearing 'Blue Spot' fish vans make up most of the 14.20 fish from Aberdeen, leaving Perth for the south at 16.45 on a March day in 1964 behind 'Royal Scot' 4-6-0 No 46162* Queen's Westminster Rifleman*, a protagonist of the 1948 Locomotive Exchanges.* / W. J. V. Anderson



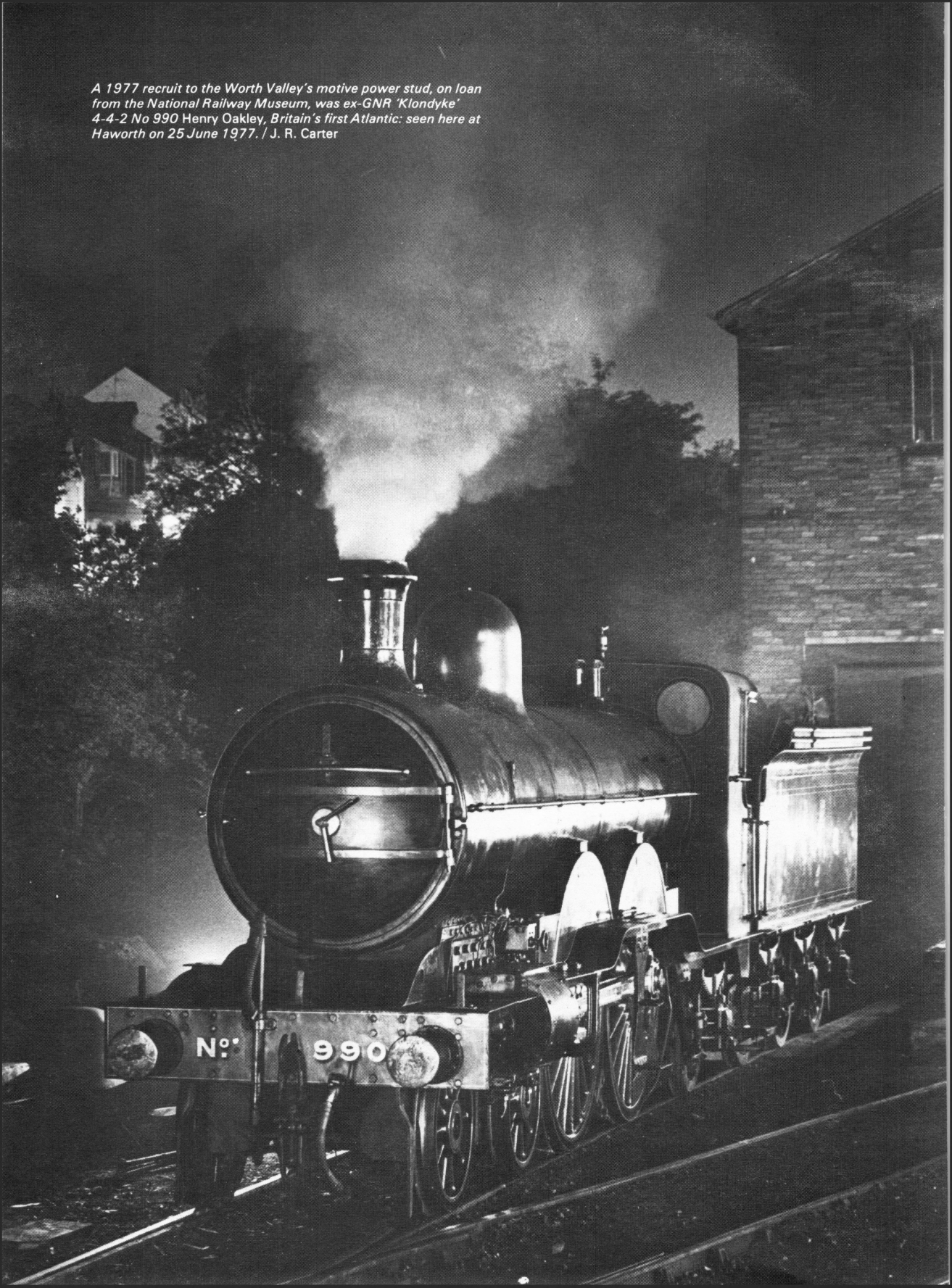
Above left: *Final express passenger fling of Gresley's Class A4 Pacifics was on the Aberdeen-Glasgow service: here No 60016* Silver King *makes a spirited getaway from Perth at the head of the 13.30 from Aberdeen in July 1964.* / W. J. V. Anderson

Left: *The same train 13 years later: the 13.40 from Aberdeen heads out of Perth for Glasgow — but bound for that city's Queen Street station since closure of Buchanan Street — behind No 47.211 on 30 June 1977.* / B. Watkins

Above: *The 19.52 Glasgow Queen Street-Dundee approaches Perth station on 6 July 1976 behind diesel No 27.035.* / C. R. Davis

Below left: *A refurbished Metro-Cammell dmu in the latest livery chatters out of Perth on the 17.16 service to Arbroath on 30 June 1977.* / B. Watkins

Below right: *Redundant sidings were being removed on 14 November 1973 as Class 40 diesel No 280 set course for Aberdeen with the 14.05 parcels from Perth.* / Brian Morrison



A 1977 recruit to the Worth Valley's motive power stud, on loan from the National Railway Museum, was ex-GNR 'Klondyke' 4-4-2 No 990 Henry Oakley, *Britain's first Atlantic: seen here at Haworth on 25 June 1977.* / J. R. Carter

Reviving the Worth Valley

A story of ten years' hard — but enjoyable — labour

M. GOODALL

Many people these past few years have been drawn to the idea of operating a private railway by the sight, sound and smell of the old-fashioned steam train. But they soon find that train running becomes almost a subsidiary concern when they get to grips with the multitude of problems that confront the private railway company these days. The leasing and repair of properties, employment of part-time staff, catering facilities and financial management — these are just a few of the subjects which regularly preoccupy meetings of the Directors of the Worth Valley Railway. The day-to-day running of trains needs their formal attention far less frequently.

The present Worth Valley Railway has been operating as a private venture for ten years. Following seven years of protracted negotiations it re-opened the 5 mile branch on 29 June 1968. Its progress since then can be divided into two distinct five-year periods. From a cautious beginning the traffic level surged rapidly upwards. After an artificial peak in 1971 stimulated by the release of EMI's full-length film version of *The Railway Children*, of which the exterior scenes were shot in the Worth Valley, carryings slumped, then began a modest annual increase which has been the general pattern since 1973. Thus for the first five years the railway was faced with the problem of how to enlarge its facilities to keep pace with public demand. During the last five years it has been able to settle down and consolidate its established position.

The early growth was difficult to predict. Operations started with a weekend-only service in the early summer of 1968, wherein one diesel railbus, one steam locomotive and three or four coaches between them achieved a weekly passenger train mileage of 122. By 1973 the midsummer service ran every day, peaking on Sundays, and required one railbus, three steam locomotives and anything up to 12 coaches. In the summer of 1973 the weekly passenger train mileage had reached 512.

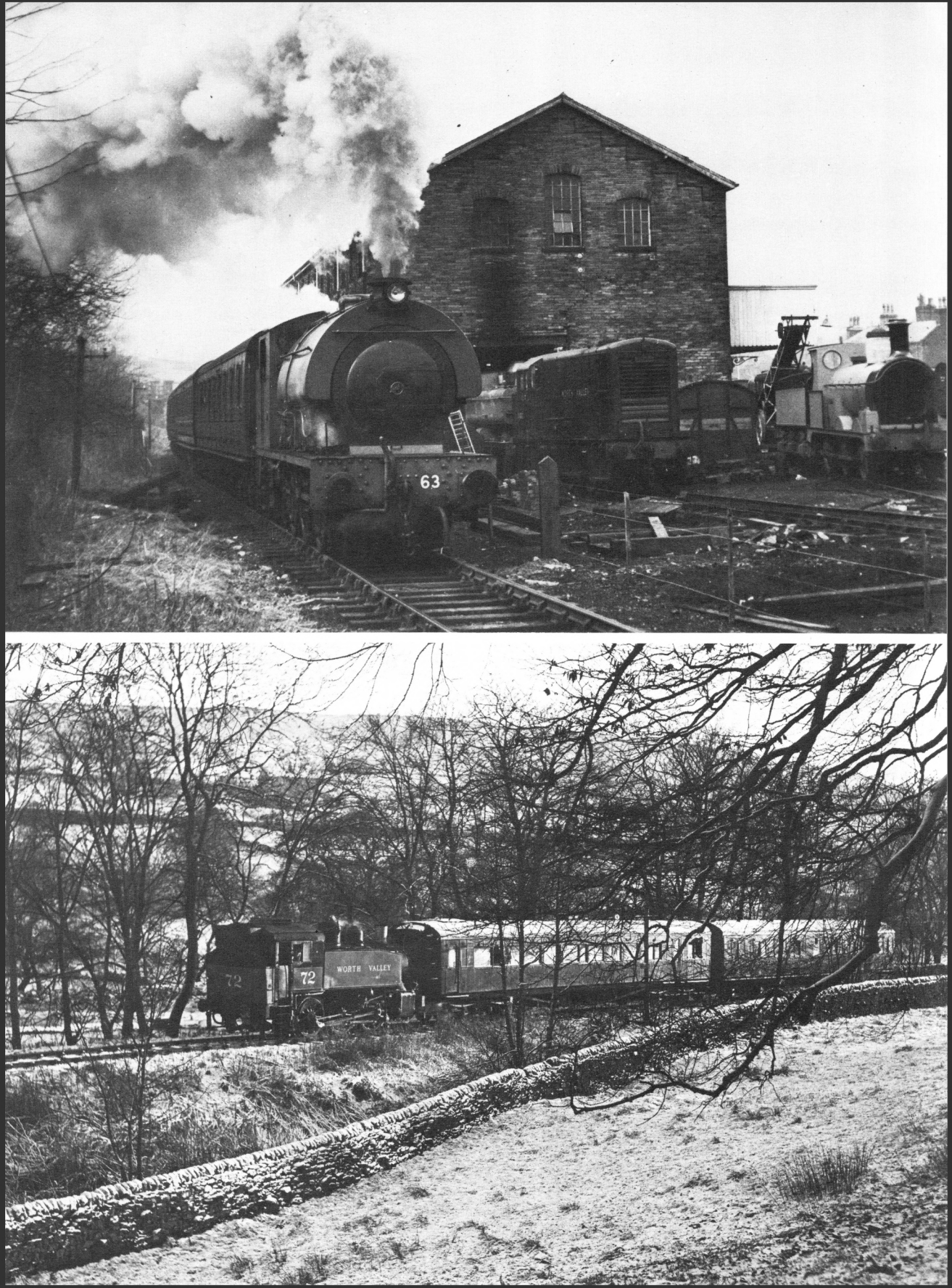
Fortunately the early rapid growth inspired many hurriedly contrived schemes whereby the line coped more or less adequately with the ever-increasing demand. At Keighley the station platform was extended to take longer trains; a system of locomotive working was introduced which cut down the turnround time; and watering facilities were provided to obviate the delay which this vital activity had hitherto placed on the turnround at Oxenhope. This facility for rapid improvisation was a blessing in disguise when the onslaught of 1971 burst and a completely new passing loop had to be installed in a matter of weeks at the line's mid-point near Damems station if any sort of order was to be maintained in the threatening chaos of the midsummer peak.

In the days prior to June 1968 everyone approached the preservation project with a fair degree of euphoria. All that seemed to matter was the right to purchase the line: then we could immediately realise the dreams and aspirations of those who worked so hard to achieve the objective. Most people seemed convinced that once the line was in operation the major problems would be out of the way and we could sit down and get on with the pleasant and relatively easy task of running a railway. In retrospect the problems associated with re-opening the line pale into insignificance compared with those of actually keeping it running. Any fond belief that the going would be easy once trains were running again was rudely shattered after June 1968.

The key to any form of success is good management — especially in the financial field. Running a private railway is very much a business, no matter what motivates those who operate it. When the line re-opened one Society officer suggested that we should rest content with achievement of the aim to purchase the line: the whole venture could be put at risk if we tried to run trains. They were sage words. Whether those active members who had devoted so much time and energy towards keeping the line open would have been so dedicated without the end product of seeing 'their' trains in action, and whether the public at large would have continued to support a static railway is questionable. Nevertheless, it is a fact that running a private steam railway is an expensive business fraught with innumerable hazards.

Over the first eight full years of operation the total expenditure on track, rolling stock, fuel and station buildings came to no less than £206,000. Of this 33 per cent went on track and bridgeworks, 27 per cent on rolling stock, 26 per cent on fuel and 14 per cent on stations. Inflation played its part in escalating the expenditure: for example, the cost of fuel, although consumption has remained fairly static since 1974, soared from £6,511 to £11,308 per annum between then and 1977.

The Worth Valley has no real financial support in the form of backing from any outside bodies, public or private. All costs, including the purchase of the line, are met out of self-generated revenue, Society subscriptions and the members' own private efforts. Thus the railway quite literally has to pay its way.


63
72
WORTH VALLEY

Above left: *Haworth yard on 11 April 1970: RSH 0-6-0ST No 63 of 1954, formerly operated by Stewarts & Lloyds at Corby, passes on the 16.15 Keighley-Oxenhope, while English Electric diesel 0-6-0 prototype No D0226 shunts ex-GWR and latterly London Transport 0-6-0PT No L89 into the shed, and ex-L&YR 0-6-0 No 957 yawns over the pit road.* / Ian G. Holt

Below left: *Ex-SR Class USA 0-6-0T No 72 leaves Oxenhope with the Sunday 15.15 to Haworth on 4 January 1970.* / John M. Boyes

Above: *Setting up the shop: ex-LNER Class N2 0-6-2T No 4744 arrives at Ingrow West with coaches for the preservation operation on 31 July 1965. The N2 had to be taken out of service for major boiler repairs at the start of the 1970s.* / Ian G. Holt

That it has never been overdrawn at the bank by more than a few pounds on one or two brief occasions and never been unable to meet its financial commitments is an indication of the success achieved in this all-important aspect of its operations. This success is largely the result of a close and continued scrutiny of the line's operating performance and a marked unwillingness to invest in grandiose schemes which cannot reasonably be justified and funded out of projected revenue.

This hard-nosed financial attitude had prompted complaints, for example about shabby liveries on vehicles that have not been properly repainted for many years, or the lack of restoration activity on locomotives like the Hughes 'Crab' 2-6-0 No 42700, which stood mechanically neglected for some nine years until its recent transfer to the National Railway Museum at York. On the other side of the coin it has meant that, when faced with an imminent crisis such as the partial collapse of Haworth station platform, sufficient cash has been available and the financial arrangements have had the reserve to deal with the problem and avoid the major operational disruption that would have occurred if the station had had to close.

The most pressing demands on financial resources have come from the track and assorted civil engineering facilities. In the period 1972-1977 expenditure on these items alone has been no less than £55,000. Other departments have had to take second place and often adopt a policy of make-do-and-mend to satisfy the essential requirements of the civil engineering side.

The reason for this expenditure is simple. British Railways closed the line in 1962, but its demise had been forecast long before that date. Consequently it suffered a lingering death during which the trackworks were allowed to deteriorate; it did not have the benfit of the sudden Beeching axeing which cut off many similar lines in the prime of life. By 1968, therefore, despite certain measures of preventive maintenance by the Society, the Worth Valley line was in an extremely run-down condition. True the track was there, which is more than some would-be preservation schemes can claim, but its state was far from re-assuring to those responsible for the safe operation of traffic.

Large sections of the main running line consisted of badly worn rails supported by wooden sleepers that were almost non-existent, while the sleepers themselves were embedded in nothing more substantial than ash ballast. Over the last ten years there are few sections which have not required a major renewal of either rails, chairs, sleepers or ballast — in many cases all four. At the outset an annual programme was drawn

Above: *The 23ton Peckett 0-4-0ST No 1999, built in 1941 and last in the employ of the North Western Gas Board at Darwen, was one of the Worth Valley Society's earliest restoration projects. On this January day in 1969 it was making one of its infrequent passenger service appearances at Oakworth.* / N. Hellewell

Below: *The enthusiasts' weekend of 4 April 1976: a Keighley-Oxenhope train is double-headed near Ingrow by Ivatt Class 2 2-6-2T No 41241, in maroon livery, and ex-Swedish Railways Riddles WD 2-8-0 No 1931.* / L. A. Nixon

Above right: *Winter cloaks Haworth station on 15 February 1969 as the Class 72 0-6-0T* Joem *bustles in on the 15.20 from Oxenhope.* Joem *was a star of perhaps the best-known film set on the Worth Valley line or using its equipment,* The Railway Children. / Allan Stewart

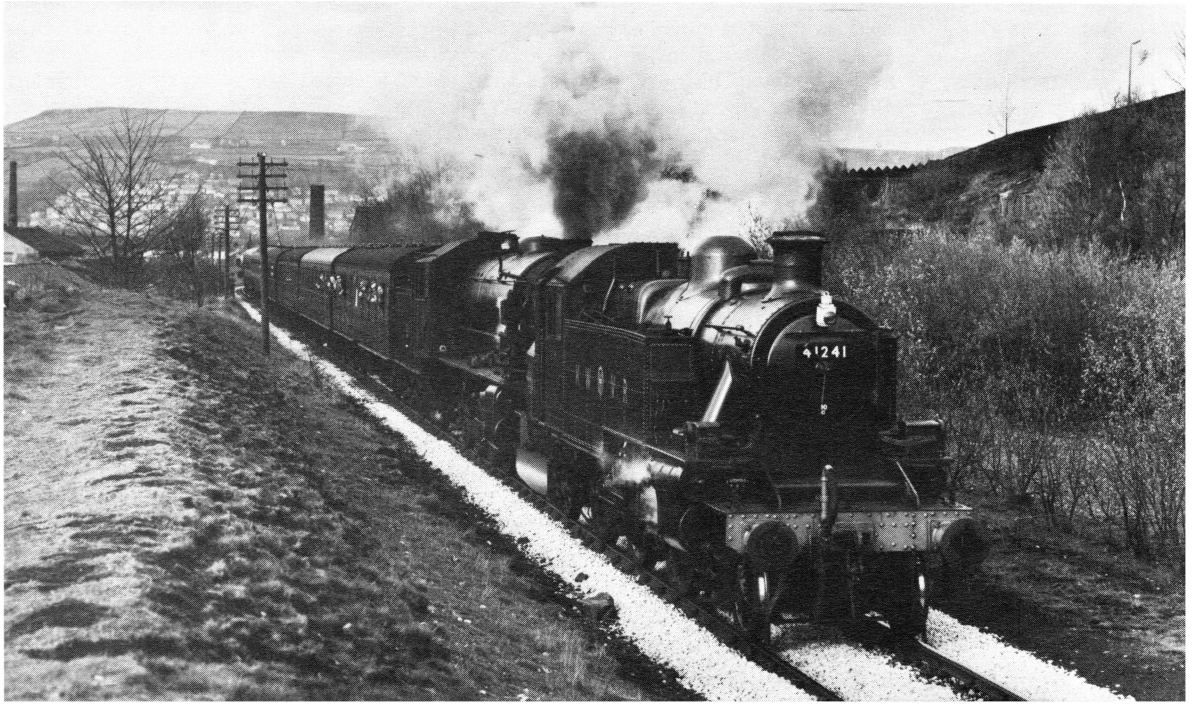
Below right: *It's summer now and Oakworth looks delightfully sylvan as Class 2 2-6-2T No 41241 pauses with the 17.55 Keighley-Oxenhope service on 20 July 1968.* / J. Scrace

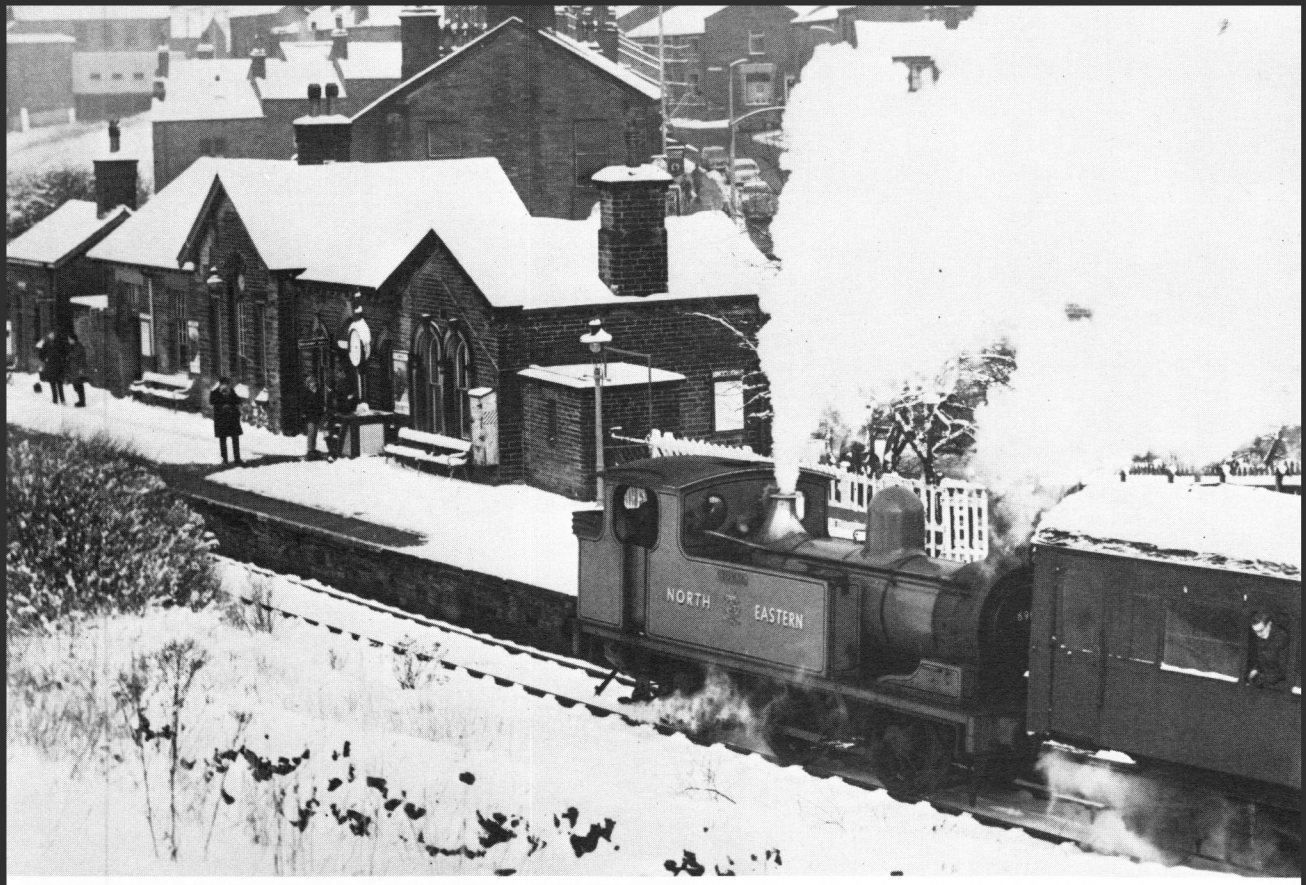
up that predicated renewal of something like a half-mile of track per year.

Such major renewals pose a problem with a single-line railway that runs at least once a week the whole year round and relies heavily on voluntary labour to keep it going. Consequently an annual Civil Maintenance Week is organised — usually in September — when the really heavy work of the annual programme is undertaken. Given pre-planning to the last detail, within a few minutes of the passage of the last Sunday evening train anything up to a half-mile of track can be ripped out. By the following Saturday morning the bed has been dug out and levelled, new sleepers, chairs and rails have been installed and sufficient ballast has been dropped to allow safe passage of the first train the following weekend.

That there have been one or two close shaves during these operations goes without saying. The hiring of a mini-bus to replace the Saturday morning railbus service has often been necessary to give the maintenance gangs a few hours' additional grace in which to make the track serviceable. On one memorable occasion a combination of poor weather and newly laid rail so badly affected the ability of 2-6-2T No 41241 to find purchase for all its six driving wheels at any one time that it had to be ignominiously hauled around by the line's 500hp diesel *Vulcan.*

One cannot leave civil engineering without reference to that essential railway constituent — the bridge. Situated in a steep-sided Pennine valley, the Worth Valley line has no less than 30 assorted bridges, tunnels and culverts which require maintenance and renewal. Several bridges are associated with the river Worth and nothing is more disconcerting than to see what this apparently innocuous stream can do to solid

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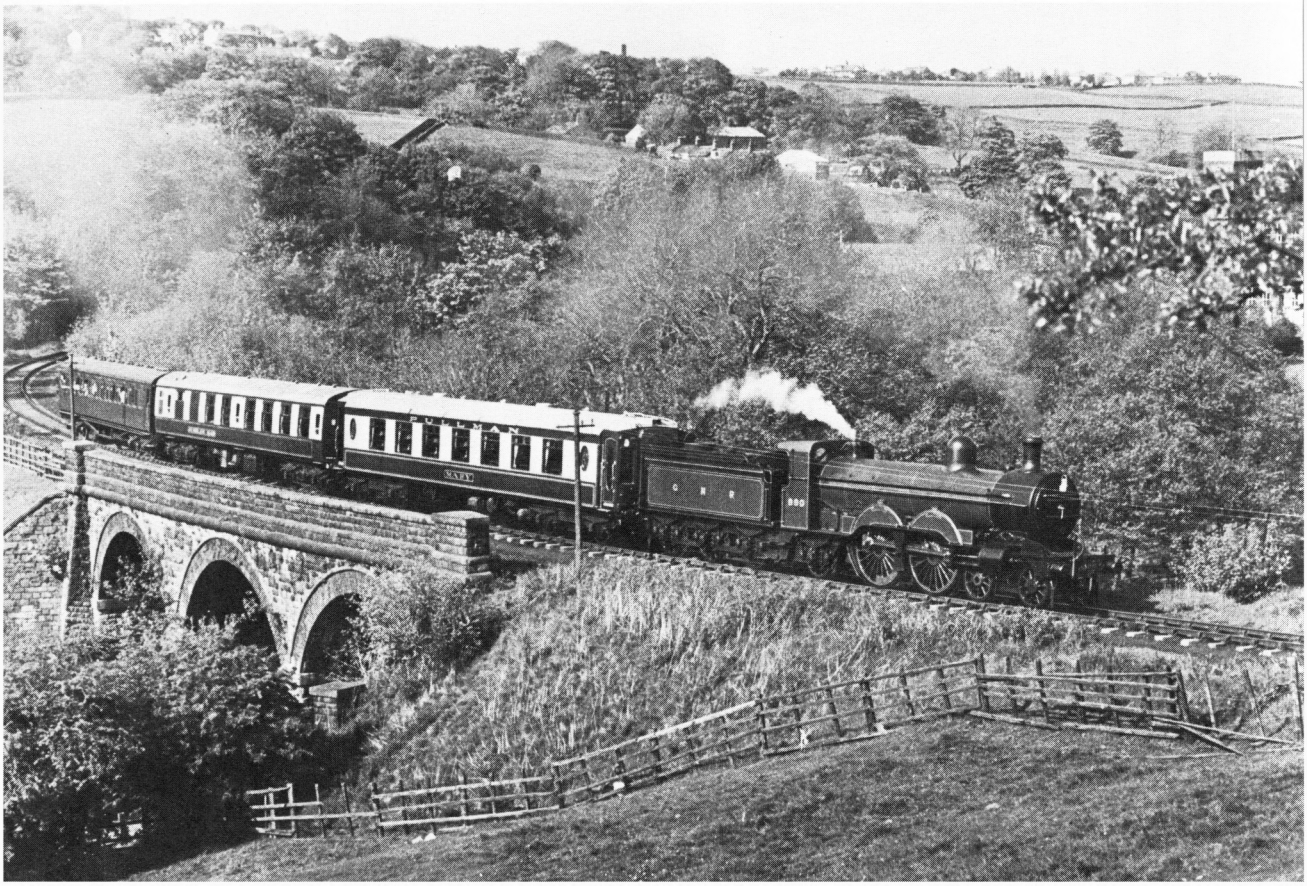

G N R

Left: *Two more pictures underlining the extremes of weather to which the Worth Valley line is subject, in this case both taken at the same location. In the upper picture tobogganers pause to watch the Class 72 0-6-0T* Joem *making sturdy music over Mytholmes Viaduct, between Keighley and Haworth, on 16 February 1969. The lower picture shows the Ivatt 4-4-2 No 990* Henry Oakley *on 1 June 1977, heading a train including the Pullman* Mary *and its companion buffet-cum-bar newly converted from a BR standard TSO coach. / R. Vallance, Rodney Wildsmith*

Above: Alongside 'Big Brother' at Keighley: ex-LMS 'Crab' 2-6-0 No 2700, on loan from the BRB's collection, is passed by diesel No 45.006 Honourable Artillery Company, *forging northward with a Nottingham-Glasgow express on 20 May 1977.* / G. W. Morrison

masonry when aided and abetted by the constant battering of passing trains. Neither is there reassurance in the knowledge that some existing overbridges which have been subjected to a century of corrosion from the combination of Pennine weather and steam locomotive exhausts were in fact scheduled for replacement by the LMS before the 1939 war.

If anyone charged with managing the line thought he could concentrate his efforts on other aspects than civil engineering once the track had been put into good order — well, the bridges soon doused any optimism. Some bridges have already been rebuilt. Others — underbridges — have been dispensed with by filling-in after closure of the access they provided. Many more will require serious attention in the not far-distant future.

The end product of the business is to run trains, which involves locomotives and coaches. Before 1968 the Worth Valley had varied ideas as to what sort of trains it would operate. These were often vague through lack of knowledge as to the measure of success the line could expect. To this end a collection of rolling stock was accumulated that was as cosmopolitan as you could imagine, ranging from a 15ton Hudswell Clarke 0-4-0ST *Lord Mayor* and an ancient four-wheel coach of Manchester Sheffield & Lincolnshire Railway origin to *Scots Guardsman*, a 'Royal Scot' 4-6-0 tipping the scales at around 130tons, and a buffet car from the 1938 'Flying Scotsman'. An early aim to provide a regular weekday service was soon abandoned, even after the arrival of two German-built diesel railbuses. To fulfil this dream would have involved many problems and totally frustrated the line's ideal of a voluntarily-operated organisation.

Other ideas were not so readily abandoned. The thought of running a small industrial tank engine and a couple of light coaches on a regular basis may seem

absurd today, but ten years ago it was attempted. After the first summer's crowds had dwindled such a service was run throughout the winter. But one winter was enough. The problems inherent in running small locomotives for 40 miles a day soon negated any benefit gained, financial or otherwise.

Always quick to adapt services to the customers' demand the Worth Valley since then has modified the winter steam operation to a Sunday afternoon shuttle between Haworth and Oxenhope using medium-sized industrial locomotives at the very least. The technical problems aside, on a cold winter afternoon the average member of the public upon whom the railway relies most heavily for its support is much more amenable to a short, relatively cheap ride than a longer, more expensive one. Such services also give the civil maintenance department much better access to the greater part of the line, where they can carry out routine tasks of maintenance unhindered by the passage of trains.

In 1968 the rolling stock on the line was almost exclusively owned by private members and associated societies. With the initial problem of securing the line's future behind it, however, the railway embarked on a policy of acquiring its own stock.

Immediately upon opening, and with a few hundred pounds to splash the Worth Valley purchased the 'Austerity' 0-6-0ST *Fred* and two British Rail standard suburban coaches, which were transported to Keighley by rail. Cost-wise, the whole exercise of 1968 ran out about the same as the purchase of one coach at today's inflated prices.

Fred, trundling by rail on a circuitous route from Walkden to Keighley, gave the line a lesson in the long-distance transportation of small locomotives by rail. It just isn't on. Running a hot axle bearing every few miles, *Fred* spent Christmas of 1968 under the lee of Hebden Bridge signalbox where its well being could be verified at regular intervals by a nearby member of the Society who could just get it in view by standing on his domestic lavatory seat. Fortunately *Fred* suffered no long-term damage.

Today around one-half of the stock on the line is owned by the railway itself, although many services are still worked by independently-owned vehicles. To do otherwise could still strain the railway's own fleet considerably and deprive the public of the opportunity of riding in or behind some of the more interesting items. To finance the purchase of most of its own locomotives the railway has generally obtained interest-free loans from members and paid them back out of long-term revenue. As far as privately-owned vehicles are concerned maintenance and operating costs are usually borne by the railway and rent-free accommodation is provided.

No strict policy as to the use and maintenance of locomotives has ever been adopted. With such heavy finance being directed to the civil engineering department and a large choice of locomotives available, maintenance has been carried out on an as-and-when-necessary basis. Whether or not a complete major overhaul could be justified on a locomotive that may run no more than 3,000 miles per annum is open to serious question, even if the cash were available for such practice. With a large number of locomotives to choose from the railway has two clear options. It could determine a minimal number of locomotives — which it did in the early years of operation — and concentrate its efforts on them to the disregard of the remainder or widen its scope and encourage activities in a much larger field — which is does today.

This change in policy was largely dictated by circumstances. In the beginning it was often a case of all-hands-to-the-pump just to ensure that the service could continue. Firmly established and with a larger number of locomotives more or less in an immediately serviceable condition, today's situation allows much greater freedom of choice to those charged with maintaining the fleet. This is not, however, a sign of complacency. The steam locomotive is the line's principal *raison d'être.* It is also extremely temperamental and cumbersome to maintain. Trivial defects such as a leaking boiler tube or loose bearing bush can quickly render it unserviceable at the most inopportune moment. Whilst such mishaps would be a minor irritant to a large professional organisation, they can be a serious handicap to a small voluntary group. To the Worth Valley the long-term well-being of the machine is a key factor in deciding whether it should continue in service.

The problems of actually running steam locomotives in today's circumstances are too varied to discuss comprehensively. They range from the difficulties of welding seams in copper fireboxes, and the complex regulations for removal and disposal of blue-asbestos boiler lagging, to methods of reducing tyre wear on sharp curves and combating smoke pollution. This last is worth a little further examination.

In 1968 only the northern half of the line was in a smoke-free zone, but by 1974 legislation had brought the whole line within the relevant Acts of Parliament. At the outset in 1968 cheap opencast coal was bought for the two available locomotives and thick palls of smoke marked their passage along the valley bottom. That could not be tolerated and a change to a more expensive type of steam coal had to be made. But as the years progressed and the variety of locomotive power widened even this better class of fuel created problems. Complaints from the public and local health authorities prompted an investigation by the Coal Board, who eventually had to admit that due to lack of

demand they could not always guarantee the standard of coal supplied. Experiments with modified smokebox arrangements and the diversion of vacuum ejector exhausts into the ashpan led to some improvements, to the extent that the lately restored Roberts Stephenson & Hawthorn 0-6-0ST No 57 is far superior in its smoke control and steaming capabilities than sister locomotive No 62 ever was.

The smoke problem created by using coal at Haworth during preliminary steam raising has been largely eliminated by the adoption of expensive coke substitutes. It has, however, led to complaints about the smell these sometimes generate — you can't please all the people all the time. If someone should dream up an Act of Parliament to abolish odours — well, the Worth Valley will have another problem on its hands.

Further experiments in smoke control have led to the importation of various brands of soft anthracite fuels from South Wales collieries and an entry into oil-burning. Apart from the greatly increased cost of transport they incur, Welsh coals have produced mixed results. Some produced steam, some didn't — one in particular provided the unique spectacle of an engine driver buying a couple of bags of household coal in order to complete his journey! Hudswell Clarke 0-6-0T *Hamburg* set off in fine style from Keighley with its firebox full of Welsh coal, but after three miles its sharp blast had literally transferred the lot into the smokebox, where it did little except burn

Above: *Period passengers: members of the cast of* The Railway Children *take a break from filming at Oakworth on 12 May 1970.* / R. Higgins

Below: *Decked out in the imaginary livery of the 'GN&SR', ex-L&YR 0-6-0 No 957 enters Haworth yard after a filming session for* The Railway Children. *The 0-6-0's age is now a deterrent to its frequent use.* / M. S. Welch

Newly restored to active life after eight years' dereliction in the Barry scrapyard, Stanier 2-8-0 No 8431 gets the feel of track under its moving wheels again, piloting the ex-Swedish 2-8-0 No 1931 between Haworth and Oxenhope on 6 December 1975. / R. Higgins

the paintwork. Fortuitously, despite the fact that it was Sunday, the local coal merchant was on hand at Oakworth to alleviate the problem.

The opportunity to purchase the Longmoor Military Railway 'Austerity' saddle tank No 118 *Brussels* arose in 1971. Already converted to an oil-burner, this locomotive offered scope to experiment further with smoke control. Initial experience showed it to be an extremely inefficient and poor steaming locomotive. Perseverance and experiment paid off, however, to the extent that when USA 0-6-0T No 72 became due for a boiler retube and a heavy rebuild of the rear end frames and bunker it was converted most successfully into an oil burner. From being one of the line's problem children in the smoke pollution field, No 72 became a smoke-free locomotive.

The acquisition of No 3 platform at Keighley station in 1976 eased the smoke problem even further. Instead of having to shunt and keep a large fire on the boil preparatory to the five-mile climb to Oxenhope,

locomotives now had a quick run-round, which helps in that fires can be built up on the downhill journey in readiness for a more immediate start from the northern terminus.

As a postscript to the subject of fuel, one should add that the introduction of oil-burning locomotives was by no means universally popular amongst the firemen. But there has been gain in a way. There is evidence recently of a self-imposed discipline that has led to better firing technique on the coal-fired locomotives!

With a present-day fleet of over 30 locomotives built up in the early years the railway is well supplied with power. Since 1972 there have been only five new arrivals on the line, two of which were Class 9 2-10-0 No 92220 *Evening Star* and Great Northern 4-4-2 No 990 *Henry Oakley* from the National Railway Museum's collection. Relationships with the Museum authorities go back to early 1968 when the Hughes 'Crab' 2-6-0 No 42700 came to the railway from store at Hellifield. Wherever possible the Worth Valley adopts a policy of utilising the NRM locomotives in normal service in order that the public may not only see them but also have the opportunity to ride behind them.

On the coaching side the emphasis today is on use of ex-British Rail standard vehicles. The pre-nationalisation relics upon which the line depended exclusively in 1968 have now been more or less pensioned off as far as regular service is concerned. The maintenance and operation of standard coaches are greatly assisted by the interchangeability of spare parts which are also most readily available. This policy also avoids subjecting the rarer veterans to the abuses of everyday public operation, so that they can be more readily preserved for their eventual restoration as museum pieces.

Up to now I have dwelt largely, if only minutely, on the problems associated with the railway's major assets and interests. There are many others, equally pressing and important to those charged with their organisation. Catering, the upkeep of stations, publicity and staffing are subjects well to the fore at Society meetings, for instance.

Catering on the Worth Valley has largely developed over the past five years. Early attempts were confined to the sale of sweets, soft drinks and the like at stations and the occasional use of the 1938 'Flying Scotsman' buffet car. But weight and limited seating capacity handicapped the LNER vehicle. Not until 1973 was on-train catering more permanently established with the acquisition of an ex-diesel multiple-unit buffet trailer, which at 26tons weight and seating 53 passengers was much more universally adaptable to the operational needs of the line. Since that time a further catering vehicle has been provided in the form of a British Rail standard TSO which the railway converted into a superior buffet-cum-bar to accompany its Pullman Car No 84 on special occasions.

Stations and buildings can be split into two separate groups: those connected with the operation of the line; and those in independent use, but which come under the company's jurisdiction by virtue of their presence on the railway's land. The latter are simply managed through the services of a local firm of estate agents, upon whose advice the railway usually acts.

The station buildings, being over a century old, were not in the best of health when the present organisation assumed responsibility. Although structurally sound, they needed a great deal of internal renovation, not only to arrest the spread of varying forms of decay, but also to bring them into line with the needs of a tourist-orientated business. The Worth Valley side of Keighley station, rented from British Rail, has been tidied up, but remains largely in its original condition. Ingrow, badly vandalised and little used, has been largely demolished and the site cleaned up. Haworth and Oxenhope stations have been heavily rebuilt internally to cope with the change from a purely railway function to that of a tourist attraction, so Oakworth is the only station to remain virtually in its original condition. It has been the policy of the railway to maintain this station as nearly as possible 'as built'.

An active publicity department is essential to any successful tourist organisation. The need to cover the enthusiast is minimal — he knows of the railway's existence through the popular railway press. It is the general public that needs almost all the PR attention. Local press advertising has some value, as does mention gained through the good offices of local radio stations. Of more far-reaching effect is the publicity gimmick — the attendance of a locomotive at a local gala, fete or Lord Mayor's parade, or the celebration of a well-publicised event such as the recent American Bicentenary year. For this last, USA 0-6-0T No 72 was specially renumbered 1776 and decorated for the occasion. The widespread press and television coverage this attracted was well worth the effort that went into its organisation.

I have barely scratched the surface of the difficulties involved in running the Worth Valley Railway. The line has been fortunate in that many of its officials of the 1968 era are still deeply involved even if they have changed their pursuits within the organisaion. If the second ten years are to be as fruitful as the first it will need all the skill, dedication, good judgement and hard work behind the scenes that has already been committed. That the present organisation still attracts new active members and increasing participation by the younger element in its management is, hopefully, a good omen for the future.

Signalling the 'Blue Pullmans'

In the old mechanical boxes you had to be nimble to keep the Pullman's road clear

ADRIAN VAUGHAN

The 'Metro-Cammell 'Blue Pullman' diesel multiple-units made their debut on the London Midland Region in 1939. The following year three eight-car sets were handed over to the Western Region, which soon started Birmingham and Bristol Pullman services from London. In 1961 a Paddington-South Wales service was added. The 'Bristol Pullman' and 'South Wales Pullman' I saw almost weekday in and weekday out, for I was a signalman at Challow or later Uffington throughout their careers.

The 'Bristol Pullman' worked to this weekday schedule:

08.15 Bristol-Paddington
11.45 Paddington-Weston-super-Mare
14.50 Weston-super-Mare-Paddington
17.45 Paddington-Bristol

The 'Swansea Pullman' started for Paddington at 06.50 and returned from London at 16.40, but in 1964 they decided the set could not be left idle midday. So a shuttle service was arranged like this:

06.50 Swansea-Paddington
11.00 Paddington-Cardiff
14.30 Cardiff-Paddington
17.40 Paddington-Swansea

To signalmen in 1961 the 'Blue Pullmans' looked exceptionally fast. We credited them with speeds of 100mph between Badminton and Wootton Bassett, taking their point-to-point running times as a guide, but remember that in 1961 we were still unused to diesel pace, which was unquestionably faster than that of the average steam engine we saw. By 1964 Pullman speed was no longer remarkable.

Up to 1958 steam-hauled express trains still ran the 77.3miles between Swindon and Paddington (or vice versa) on schedules varying from 61min for the 'Bristolian' to 89min for the 'Red Dragon'. With the complete takeover of express trains by diesels in the autumn of 1963 variations of non-stop — and even start-to-stop — schedules became minimal. All trains ran very fast whether they had the dignity of a nameboard or not. These were some typical Swindon-Paddington and Paddington-Swindon schedules in early 1964:

Up	*min*	**Down**	*min*
'Bristol Pullman'	75½	'Bristolian'	72
'Swansea Pullman	70½	09.00 Paddington	72
'Red Dragon'	74½	11.00 Paddington	73
11.15 Bristol	76	16.55 Paddington	73
'Bristolian'	75½	'Bristol Pullman'	71

The 11.15 Bristol and 11.00 Paddington called at Swindon.
The 16.55 Paddington was the 'Cheltenham Spa Express'. This and the South Wales expresses were 'Western' diesel-hauled while Bristol trains, apart from the Pullman, were 'Warship'-hauled.

The 'Blue Pullmans' were by no means the first trains to run at such speeds. Between 1932 and 1939 the 14.40 from Cheltenham, the 'Cheltenham Flyer', covered the 77.3 miles in 65min start to stop, the 'Bristolian' in 63min up and 66min down; a few others made the run in 72-75min pass to stop. As far back as 1910 two up trains were allowed 74min from passing Swindon to the Paddington stop.

The 'Bristol Pullman' was the first regular Pullman working into Temple Meads station, but not the first west of Reading. In the summer of 1955 a train of traditional Pullman coaches was introduced between Paddington and Swansea, leaving London behind a 'Castle' each morning at 08.50 and returning from Swansea at 16.30 (there was a far earlier Pullman service out of Paddington, the short-lived 'Torquay Pullman' of 1929). The diesel Pullmans were originally painted blue below window level, white from the windows to the roof. Emblazoned across the front of the blue, bullet nose of each power car was the Pullman coat of arms, very flamboyantly done in red and gold. Red buffer stocks set off the blue fronts very nicely — looking back on them they really were quite handsome trains. The driver wore a blue-and-white uniform — to be promptly dubbed 'the Wall's Ice-cream man' — and I believe each unit carried one or two fitters to keep the engines running nicely. In their final years the Pullmans were repainted in BR's Pullman livery with blue around the windows and pearl-grey over the rest of the bodywork.

The timekeeping of the Pullman services was quite good. On 13 weekdays between 11 May and 28 May 1965 I recorded the 08.15 Bristol as passing Uffington 4min early, 1min early, right time, 2min late on six

occasions, and on the remaining days 3, 4, 5 and 6min late. The 06.50 Swansea, which followed 10min behind the 'Bristol Pullman' was, over the same period 2min early twice, right time twice, 2min late on five occasions, and 3, 7, 8 and 12min late on the remainder.

To signal the Pullmans from box to box the old Great Western Railway bell code 4-1-3 'Is Line Clear for Express Diesel Railcar?' was revived. On the down line at Challow, before 'Line Clear' could be acknowledged to Wantage Road for a Pullman, 'Line Clear' had to be obtained from Uffington. This was a special instruction applying only to the diesel Pullmans because the authorities felt that the down distant signal at Challow was not far enough away from the first 'stop' signal to provide sufficient braking distance for such fast trains. Yet, as can be seen from the tables, they were not that much faster than regular, locomotive-hauled trains. The 'Warship'-hauled 'Bristolian' was just as fast, but in 1964 no special instructions were in force for it at Challow. Curiously enough, the precautions adopted for the Pullman trains had been ordered for the 'Bristolian' when it first went over to diesel haulage, but they were later found unnecessary and so they were dropped.

Such special precautions led signalmen over the years to believe that diesels had inferior brakes to steam engines. Men who had signalled the 'Cheltenham Flyer' before the war remembered that no special precautions were thought necessary to ensure its braking distance; and that train was the fastest the route saw until the introduction of the HST in 1975.

After the 16.40 Paddington had been re-timed to 17.40 the 'long-block' section working at Challow sometimes caused delay, because the two trains ran down from London at such close headway. Quite frequently only 4min separated them at Steventon. While this was tolerable on lines signalled with four-aspect colour-lights, it was a chronic problem on semaphore-signalled lines, where the boxes were almost too far apart for such very close running.

Consider, for instance, the working of the 17.40 and 17.45 Paddington Pullmans on 13 May 1965. The 17.40 cleared Challow at 18.07 as the 17.45 was passing Steventon. Challow sent 'Train out of section' to Wantage Road for the 17.40, but had to 'refuse' the 17.45 until the 17.40 had cleared Uffington. At 18.49 Uffington sent 'TOS' for the 17.40 and the signalman rapidly rattled out 4-1-3 to Uffington for the 17.45, Uffington acknowledged it and turned the indicator to 'Line Clear'. Challow then tapped out 4-1-3 to Wantage Road and turned the indicator to 'Line Clear', thus releasing Wantage Road's intermediate block signals at Circourt. But the 17.45 was by then passing Wantage at 90mph. The yellow gleam of the IB distant signal was reflected on the sides of the coaches, changing to green just as the driver was about to shut off power; we had 'given him the distant' with a second to spare!

There had been a frantic tapping of bells and walloping of heavy levers by three signalmen 6½ miles apart but all working in perfect unison, knowing exactly what was happening at the other boxes. Such close working was not really good railway practice, but we certainly enjoyed the challenge of trying to squeeze a quart into a pint pot. All of us were well pleased to know that we had got away with it again.

The time-keeping of the 17.45 shows how well the semaphore system coped with 'the impossible'. During the 14 weekdays from 11 May to 28 May 1965 the train was repectively 11min late passing Uffington, 5min late, right time, 2min early twice, 3min early on five occasions, 4min early, 7min early, 8min early and 11min early. The last occasion was on 21 May, when the 16.45 had managed to get away from Paddington in front of the 17.40 and to celebrate the driver had picked up all his recovery time so that he passed Uffington, 66½miles out from Paddington, in 53min — which, if I may draw tedious comparisons, was almost as fast as the epic run of the 'Castle'-hauled 17.00 from Paddington on 6 June 1932.

A curious side-effect of the introduction of diesel traction was that some signalmen, myself included, tended to say to themselves 'they'll make it up' when they were obliged to check an express. We never thought that in steam days, when we knew each minute gained on schedule had been paid for by a hard-working fireman. I remember a signalman who had been unable to get his signals 'off' quickly enough for the 'Castle'-hauled 'Bristolian', which therefore got a distant signal check and lost at least 5min running time. The signalman was nearly in tears. He rushed to his window, trying to look apologetic and simultaneously to wave 'right away' to the driver so as to prevent the man creeping on from signal to signal until he was convinced that they were all 'off'. The engine whistle shrieked and a great column of smoke erupted from the copper-capped chimney as the coasting 'Castle' was opened up to regain the earlier 95mph. Looking down from the box one had an excellent view on to the footplate — the glorious fire, the polished metal. This time all we saw was the driver waving his watch and the fireman swinging his shovel. When the diesels came on the scene we weren't nearly so worried about 'knocking five minutes out of the fast' — in fact, we coined a new phrase. 'Give 'em a tickle', we used to say.

This new attitude, combined with an enthusiastic signalman's desire to run as many trains as possible 'main line', developed a splendid game with the morning Pullmans on occasions.

On any weekday up to late 1962 Challow box was a busy place between 09.00 and 09.30, particularly on the up road. First, the 07.05 Cheltenham to Paddington express, 'Castle'-hauled, called to pick up passengers. This was followed by the 00.05 Tavistock Junction to Banbury express freight, hauled by a 59XX 'Hall' and usually known as the 'Tavi'. Behind it sped both diesel Pullmans. The Cheltenham had to be diverted from up main to up relief line in order to call at Challow station platform. Its driver always worked his 'Castle' hard away from the Challow stop on to the main line because he knew that the 'Bristol Pullman' was only 10 or 12min behind. The 'Tavi' had to go up relief line to Wantage, although it was a very fast-running train, because of the Cheltenham 'pulling out in front', so to speak, and the Pullmans coming up fast behind. If the 'Bristol Pullman' were 3 or 4min late it was possible to take a chance and let the goods run up the main, but it usually came up from Uffington so fast that the Cheltenham had not cleared my intermediate block signals at Circourt. Usually, therefore, I had not been able to clear my up distant so the goods had to brake, thereby losing valuable time and forcing me to 'put it away'. This was annoying for me and for the driver of the 'Tavi', who often did not understand why he had been delayed. I loved to see a steam engine tearing along. If only the 'Tavi' would take about 45sec longer to reach my up distant, I could clear it and give the freight a run. But I needed the driver's co-operation for this.

My opportunity came one Monday morning. The 'Tavi', running at nearly 60mph behind No 5945, passed my distant at caution as usual and came crawling round the bend to find the signals off for the up relief line. The driver stopped his train in the platform and came on the phone to ask why the 'Tavi', one of the fastest trains of the day, always 'got put in' at Challow. At last I had a chance to explain the situation and ask if he would give my theory a trial, to which he readily agreed. Next day the Cheltenham was about right time and the 'Bristol Pullman' was 4min late — perfect conditions for the experiment. As the 'Tavi' passed Uffington my mate there sent the 'Train entering Section' bell, then rang me on the phone. 'That up one was running very well, but they shut off passing here', he said wonderingly in his gentle Welsh accent. Just what we want, I thought. The Cheltenham was blazing away towards Circourt signals and would clear them in another 2½min. I waited for the buzzer which sounded when a train passed the Circourt signals, then sent the 'Train entering Section' to Wantage Road and whipped over my up main signal levers, the final one clearing the distant.

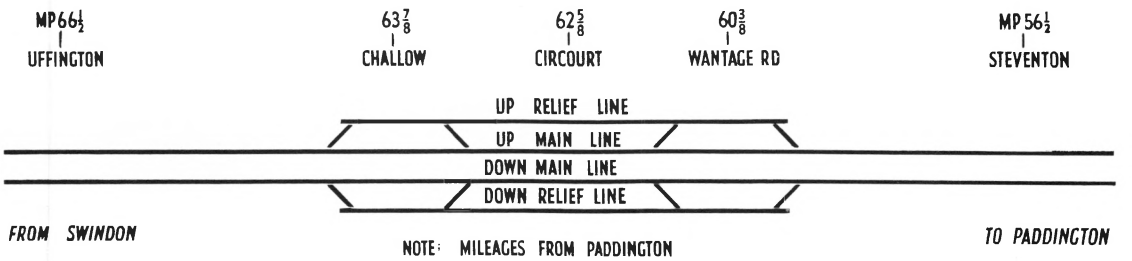
To use footplate slang, 'it dropped down the chimney' of No 5945. There was the lovely sound of

an appreciative far-off whistle, then the urgent beat of an engine being worked up hard from about 35mph. Each speed seemed to produce different rhythms — and beautiful they were. No 5945 came pounding up towards the box, whistle screaming and the footplate men waving. They would be running at 60mph by the time they passed Circourt, 35 wagons rattling and swaying behind. The driver went so well that he cleared from the main line to the West Curve at Foxhall without delaying the Bristol, though it was a very close-run thing at Steventon! The return working for the Swindon men on the 'Tavi' was with the 03.00 Croes Newydd, steel plate for Pressed Steel-Fisher at Swindon. I was able to tell them, as they passed the box, that the gamble had paid off. After that the word spread and we often found it possible, using the understanding between drivers and signalmen, to run the 'Tavi' in front of both Pullmans.

The Pullman services had their fair share of traction failures and other mishaps. We were not properly hardened to diesel failures (BR issued instructions to station announcers that in apologising to passengers for delays the term 'diesel failure' must never be used, only 'locomotive failure'.) and the apparent frailty of these powerful, thermally efficient monsters was then something of a marvel. On several occasions the diesel Pullman on one route or another had to be taken out of service and replaced by a diesel locomotive and eight traditional Pullman coaches. This happened on 14 January 1964, when the 06.50 Swansea was put

Left: *The down 'Bristol Pullman' emerges from Twerton Tunnel, Bath, on 25 April 1973; the unit is in its final BR standard Pullman livery of blue and grey.* / G. R. Hounsell

Bottom: *The substitute train of locomotive-hauled Pullmans does duty for a Pullman dmu on the 16.50 Paddington-Wolverhampton 'Birmingham Pullman' service on 11 July 1962. Fronting the rake as it passes Bentley Heath is the experimentally 'desert sand'-liveried Class 52 diesel-hydraulic prototype, No D1000* Western Enterprise. / M. Mensing



out of action by a fire in one power car. The engine burst into flames as the train was leaving Swansea and the passengers were transferred to the 07.20. After attention the 06.50 left 'light' for Paddington, but the flames erupted again at Bridgend and the unit had to be taken out of service, so the stand-by coaches had to make a quick dash to Paddington for the return working that day. In June that year the stand-by coaches were again in use on the 08.15 Bristol, hauled by a D10XX diesel. On 15 June the 'Western' diesel on the standby train itself failed at Didcot. The diesel was taken off and its crew took over the station pilot, 'Hall' No 6937, for the 53 miles on to Paddington. They had eight Pullman cars weighing about 350 tons and a fire rather on the low side, so the start from Didcot was very gentle until the fireman had got matters in hand. They passed Goring at 75mph and were all set to make up a few minutes on the schedule when they were checked at Reading owing to the 06.20 Newton Abbot-Paddington dragging away from the station. But the Newton must then have run well, for No 6937 was able to make a steady 80 after Maidenhead and got to Paddington in 33min from Reading. Without the check she would have made it in the even half-hour, but as it was she improved on the diesel Pullman time by 2min.

The vulnerability of the diesel Pullman was demonstrated one day at Challow in 1962 when a brake block fell off and ripped open the fuel tanks. The train stopped at the signalbox while the fitters fitted handkerchiefs into the gaping rents and after some banter from the signalman on the advisability of summoning *City of Truro* from Didcot to give them a shove the Pullman trundled off to Swindon. Parts of the transmission used to fall off occasionally too.

One such incident happened at about 18.15 on 8 January 1963. The driver of the 16.03 Old Oak Common freight, with a 92XXX 2-10-0, was used to running his train very fast between Didcot and Swindon to get through without being sidetracked for any express trains. His engine took water on the loop at Highworth Junction and was then 'turned out' behind the 16.40 Paddington, the 'Swansea Pullman'. He was running very well, but was surprised to be brought to a stand by signals at Little Somerford. How fast had he been running, he wondered, to catch up the Pullman? He needn't have worried: the Pullman had failed at Hullavington, strewing so much of its innards along the track that its crew thought they had smashed into a motor car.

Not every delay was due to faulty mechanism. On or about (as the policeman says in court) 25 July 1963 the 17.45 Paddington was close to Maidenhead when it hit a dog — quite a large dog, in fact. The impact shattered the compressed air pipes at the front of the train, putting the front engine out of action. The train limped on (the dog could not, it was dead) into Reading, during which time Control had decided that the train must there be taken out of service and its passenger torn from their dinners and put on to the 18.45 Paddington to Bristol, which was stopped specially to pick them up. But Control had forgotten it was Friday and most long-distance trains out of Paddington were crowded. The 18.45 duly came to a stand at the platform, but the scores of 17.45 passengers could hardly get in the doors. They were repulsed, as you might say, with heavy losses. Persuaded of the impossibility of getting any more on to the 18.45, Control allowed it to go on. The Pullman was brought back from the sidings, its passengers were reunited with their cold dinners and off they went to Bristol, arriving there some 3hr late.

There was an ambition among the signalmen at Wantage Road and Challow to route any of the Pullmans along the relief lines. This we contrived to do once in a while. I managed it when the down main line was blocked by an ex-LMS 2-8-0 which had a broken spring over its trailing driving wheels and again when I had a points failure. But the credit for the finest piece of trickery ever perpetrated on a Pullman must go to a colleague of mine at Challow. At the time it seemed to be a stunning improvisation to keep traffic moving, but in retrospect I have a feeling it was horribly illegal.

The 18.01 Didcot to Swindon stopping train was scheduled to wait at Challow to allow both 17.40 and 17.45 Paddington Pullmans to pass. On this evening the 17.40 coasted to a stand at Challow and asked for assistance because the engines had failed. Locomotives may have been available at Didcot or Swindon, but my mate wasn't going to lose this opportunity of 'getting one over' the Pullman. He suggested that the down stopper should get on the front of the Pullman and tow it to Swindon. The Pullman train crew agreed, but I don't know if anyone asked Control (we rarely did ask them; we usually told them after the event). The stopper consisted of 2-6-2T No 6136 and two coaches, which were duly backed on to the Pullman and coupled up. Not being a locomotive man I cannot say for certain, but I don't think that the vacuum brake operated by the driver on No 6136 could be coupled to the Pullman, in which case the eight cars were taken to Swindon on the brakes of the steam engine and its two coaches alone, which would have been a sin against every rulebook imaginable. Anyhow, the most unusual train the line had seen for a very long time set off at a cracking pace amidst much derisive whistling from No 6136 and sarcastic cheering from porters and signalman. We split our sides wondering what the Pullman passengers made of the strange whistles and chuffs coming from the front end and why they kept stopping at tiny little stations and wooden halts.

In the days of Snow Hill–2

more memories of Western action in the West Midlands

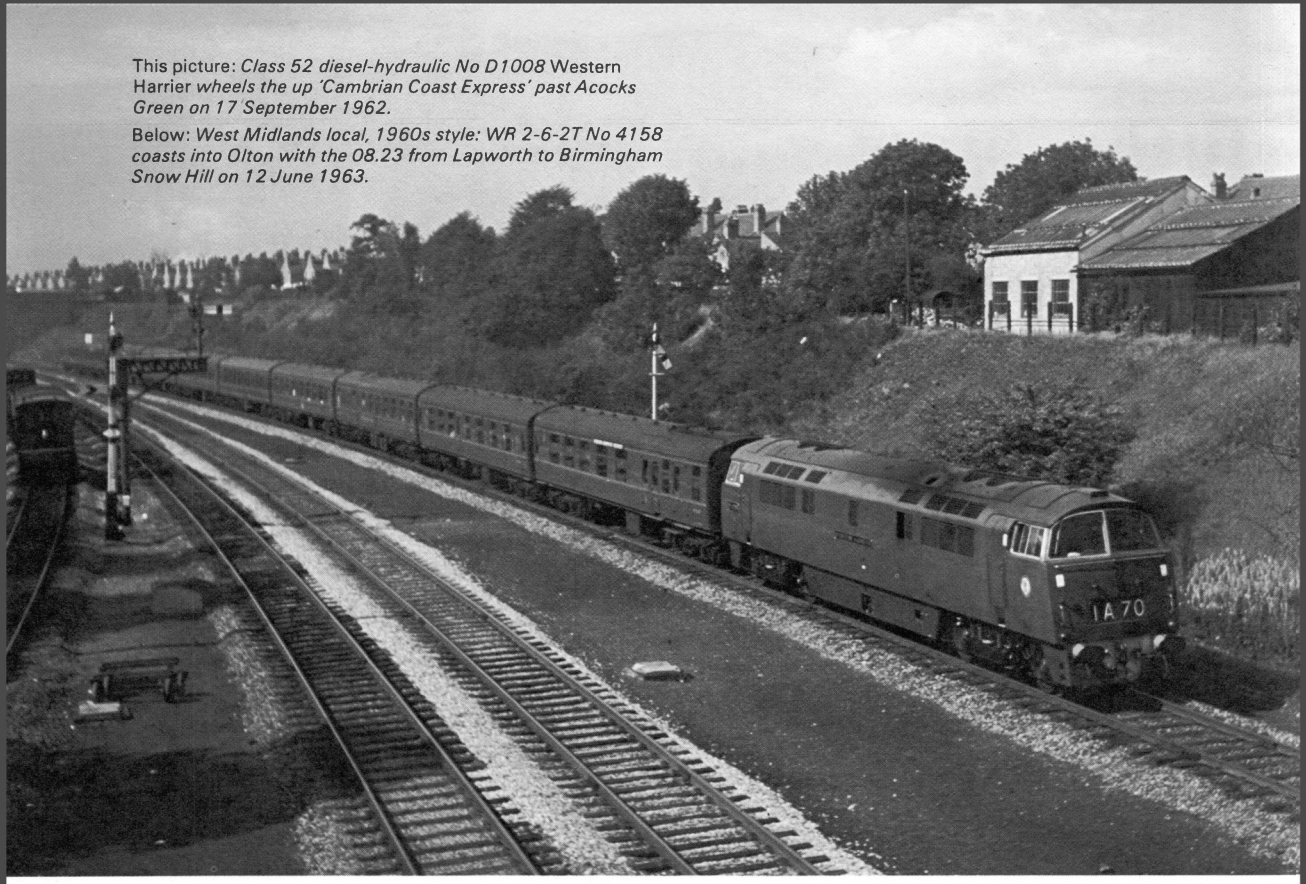
PHOTOS BY M. MENSING

This picture: *In the green dmu livery of yore, a mixed formation of a cross-country and a high-density suburban unit move through Snow Hill to back into the station's Platform 4 and form the 16.00 service to Hereford on 28 March 1961.*

Below: *The 16.50 'Birmingham Pullman' from Paddington, formed of a 'Blue Pullman' dmu, approaches Acocks Green on 18 June 1963.*

This picture: *Class 52 diesel-hydraulic No D1008* Western Harrier *wheels the up 'Cambrian Coast Express' past Acocks Green on 17 September 1962.*

Below: *West Midlands local, 1960s style: WR 2-6-2T No 4158 coasts into Olton with the 08.23 from Lapworth to Birmingham Snow Hill on 12 June 1963.*



The US passenger train is reborn

The birth of Amtrak and its struggle to re-create a viable attractive service

G. FREEMAN ALLEN

The *Official Guide,* North America's *Bradshaw,* listed around 15,000 daily inter-city passenger trains at the start of the 1930s. Rail was the accepted way to make the long-haul journey in those days and trains held about three-quarters of all the inter-city traffic offering by public transport. As the 1930s dissolved into the 1940s, the railroads spent more and more lavishly to maintain their position. Came the streamliner age and North American railroads were running the most flamboyantly equipped — and extravagantly staffed — rolling hotels ever seen on rail, some royal and presidential trains alone excepted.

Yet by 1950 over half the trains had been struck from the timetables and rail's share of the business had slumped to less than half. In 1958 one Howard Hosmer, an officer of the US Interstate Commerce Commission (ICC), got a Bronx cheer for his solemn forecast that within a decade the passenger coach could well 'take its place in the transportation museum along with the stagecoach and the steam locomotive'.

Hosmer was so nearly right, though. In that decade railroads won approval to discontinue thousands — literally — of their passenger services, so that by 1970 rail's share of the public transport market had shrunk to a niggardly 7.2 per cent, moving in fewer than 500 trains daily. Things had reached the pass that when Lyndon Johnson appointed Alan S. Boyd to head a newly-created Department of Transportation, Boyd put one of his priorities thus: 'Andrew Jackson was the first President to ride a train. We think one of our responsibilities at the Department of Transportation is to see that President Johnson is not the last.' Already a system as big as the Frisco, operating 4,600 route-miles, had swept its tracks clean of all passenger trains; and even so lately a passenger-oriented line as the Kansas City Southern was down to just two passenger services a day.

What had happened? Over medium- and long-haul distances, of course, it was essentially the post-World War II upsurge of air travel, particularly after the jetliner's debut. Air travel now dominates close on three-quarters of the US public passenger market, with buses a very poor second at around 15 per cent (hence the barbed lobbying against today's Federally supported rail passenger services that is mounted incessantly by US bus operators, frightened of losing still more ground). Over shorter distances, encouraged by motorway development, it was the road vehicle, private or public, which drained away the trains' lifeblood.

Many argue that the railroads themselves are pretty culpable. In the heyday of the passenger train they tolerated far too much cost overrun on their passenger services. Even before World War II, for instance, the reality behind those regally compendious *à la carte* dining car menus was an annual train catering loss of a million dollars on the Pennsylvania alone. By the late 1950s, when dining cars in regular use were down to about 1,400, experts reckoned that US railroads as a whole were letting their costs outstrip revenue by nearly a third; that meant an annual loss on diners alone of about £17million.

The opulent new streamliners of the late 1940s and early 1950s, with their remarkable complexes of living, eating and sleeping accommodation, their highly customised decor and — following a joint General Motors-Burlington stroke of inventive genius in 1944-5 — their very popular vista-dome cars, were very expensive outfits. Even in those days the new all-Pullman 'General' train-set for its New York-Chicago run set the Pennsylvania Railroad back almost £2million, for instance. Add to the necessity of amortising such an investment the costs of prodigal staffing and of archaic labour agreements that set a day's work for train crews at the ludicrously low mileage limit of 100 and the load factors essential even to cover costs must have been astronomical.

Take the Great Northern's 15 car 'Empire Builder', for example. The maximum number of passengers this transcontinental could accommodate on its 44hr run from Chicago to Seattle was 323, because the consist had to include a mail/baggage car, a crew dormitory, a buffet-lounge as well as a diner, and an observation saloon as well as coaches and sleepers. Locomotive crew and brakeman apart, it carried 25 train staff to look after the passengers: a conductor (the train 'manager'), two coach porters, two stewards, five chefs, six waiters, a lounge-car attendant, Pullman conductor, six sleeping-car porters and a representative of the railroad's passenger department!

The signs of a declining market had been apparent to discerning eyes before World War II. Immediately after the war the railroads were encouraged by a brief upturn in business to spend big, confident of a

GREAT NORTHERN
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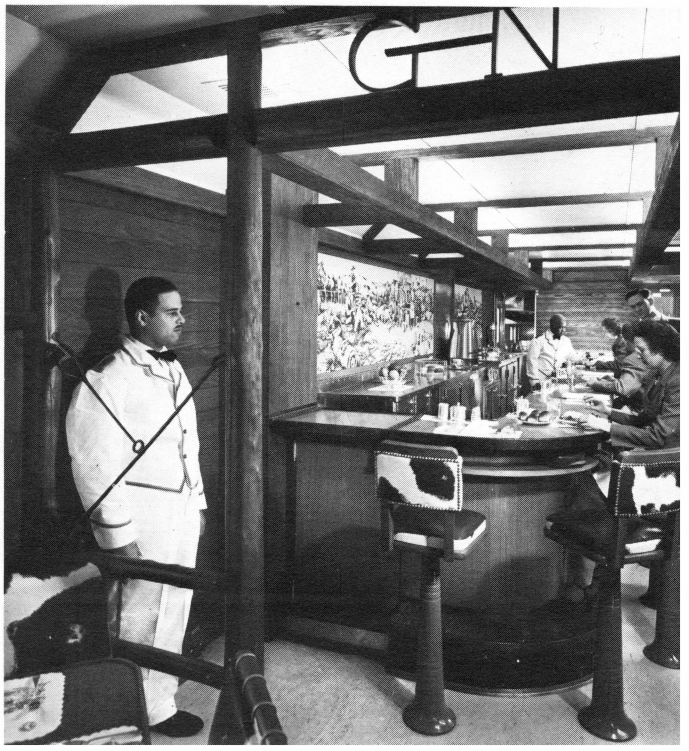
continuing boom providing they could boast an infinitely superior travelling ambience. But all too soon it was patent that the sumptuous new trains would struggle to pay off against a falling market. Trimming facilities was self-defeating: railroads which cut out duplicate catering facilities or downgraded trains by substituting coaches for Pullmans to reduce staffing and other overheads soon found that they drove away more revenue than the costs they saved. Such economies were the eventual death, for instance, of Pennsylvania's crack New York-Chicago 'Broadway Limited'. The Post Office Department piled Pelion on Ossa by deciding gradually to deprive passenger trains of their valuable head-end mail traffic, worth millions of pounds annually, so that by the time Amtrak was born travelling post offices survived only on the New York-Washington run.

The market sector that still wanted trains, wanted them with the trimmings or not at all. They made that clear to the irrepressible little Robert R. Young, financier turned railroad chairman, first of Chesapeake & Ohio and then of New York Central, who was convinced the panacea was a new generation of light-weight cars which broke with rail engineering tradition. Pullman sleeping cars, he proclaimed in full-page newspaper ads, were obsolete 'rolling tenements'. Some Eastern railroads followed his banner and tried Talgos or home-bred Talgo lookalikes, such as General Motors' Aerotrain; but the customers quickly showed their contempt for single-axle riding and cramped, plasticised interiors compared with the stately dimensions and solid gait of orthodox US equipment. All the lightweights were abruptly retired from inter-city service after a short service life.

By the 1960s a spiral of decline had set in. Critics howled that the majority of railroads were deliberately degrading their passenger trains to strengthen the case for abandonment, so that they could concentrate on money-making freight or diversify out of railroads altogether — as Pennsylvania did very heavily, for example, into real estate; that policy was to be a key factor in the financial crash of the merged Penn-Central. Both railroads and ICC were berated for weighting statistics so that passenger trains were held accountable for a great deal more than their just share of joint track, staff and signalling expenses, to bolster the argument for elimination. And all the time once effulgent trains and the once well-manicured track they ran on were deteriorating, in the case of the track to levels that enforced reductions of line speed and added lengthened schedules to the nails closing the passenger train's coffin.

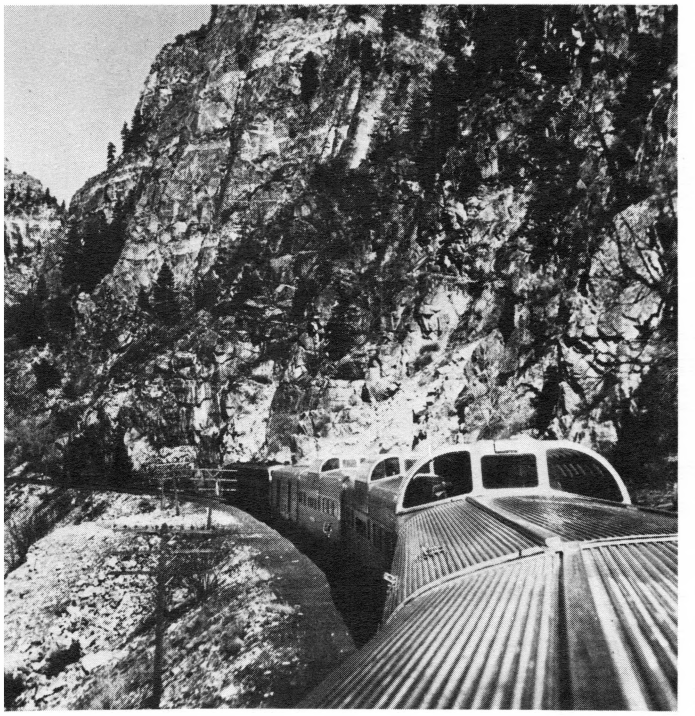
Left: *One of the great transcontinental streamliners of the 1940s, the Great Northern's 'Empire Builder' from Chicago to the Pacific North-West; this was the 1947-built train-set, the first major post-war re-equipment of a service by any US railroad (the cars were actually ordered in the height of World War II, in November 1943). Powered by two EMD 2,000hp E-7 diesels, the train is skirting Glacier National Park, in the Montana Rockies.* / Cecil J. Allen collection

Below left/Below: *Such was confidence in the passenger train's future that only four years later, in 1951, Great Northern took delivery of five new 15car 'Empire Builder' sets at a cost of over £6million (at 1951 prices) — and in 1955 they spent another £3millions-plus to add 22 huge vista-dome cars to the service. These 1951 and 1955 cars featured some eye-catching interior decor: for example, in the diner* Lake of the Isles *(below); the lounge on the lower floor of the double-deck full length vista dome* Glacier View *(centre right); and in the so-called 'Ranch Car',* Crossley Lake, *with its coffee-shop lounge got up in authentic Western style.* / Cecil J. Allen collection



Above: *Vista-dome territory par excellence — and that much-beloved of US streamliners, the 'California Zephyr', was equipped to make the most of it. Headed by an Alco triple-unit of the Denver & Rio Grande Western, the train was photographed threading Byers Canyon, west of Sulphur Springs, Colorado, on 5 September 1949.* / R. H. Kindig

Below: *This was the prospect from a vista-dome of the 'California Zephyr' as it wound through the canyons of the West.* / Cecil J. Allen collection



By the late 1960s, though, dedicated railway lobbyists were by no means lone voices clamouring for rescue of the US passenger train. The country was on the ecology kick. A powerful segment of public opinion was now thoroughly frightened by the automobile's destruction of the environment and the menace to safety of ever more jampacked airlanes.

For much of 1969 and 1970 Congress deliberated and the Nixon administration stalled over schemes for a Government-financed takeover of inter-city rail passenger services. To the end Nixon's advisers were urging him to veto the measure, but on 30 October 1971 the Rail Passenger Service Act became law. (Rail unions, incidentally, were among the bill's antagonists; they suspected establishment of a new operating body might be the pretext for modernised conditions of work and pay. One of the new passenger train-operating concern's burdens was to be an obligation to honour all existing union agreements and practices.)

The new body had until the following spring to organise itself. Starting life as the National Railroad Passenger Corporation, or Railpax for short, it soon opted for the title Amtrak (a contraction of America, Travel and Track).

Railroads running inter-city passenger services had the option of continuing them unmodified for a further two years at least or of handing them over to Amtrak — at a price. Each railroad accepting the Amtrak option had to pay the new corporation either half its total passenger service loss in the preceding year, or the amount of its avoidable loss in operating passenger trains, or twice the latter in respect of the services Amtrak was to adopt. Whatever the basis of payment, it could be made in cash or kind — ie, traction and passenger rolling stock. In return the railroads took

stock in Amtrak, which would also pay them appropriately for use of their track and terminals. The principal systems to spurn Amtrak and go it alone with their passenger trains were Southern, Denver & Rio Grande Western, and Rock Island.

Amtrak pulled in something like £115millions in cash and kind from these arrangements. To that the Federal Government's starting grants and guaranteed loans added another £80 millions or so. It wasn't a munificent basis on which to launch a new era in passenger travel — in fact it was a great deal less than the £300millions or so railroads alleged they were losing annually on passenger service pre-Amtrak.

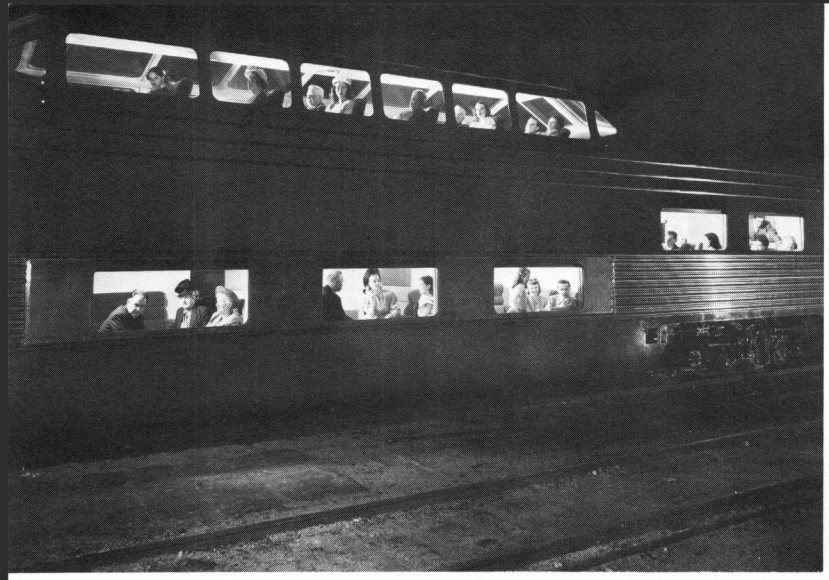
Amtrak's first timetable, inaugurated on its takeover day, 1 May 1971, was a beggarly 184 daily trains on 21 routes. To quote Amtrak's own words, it 'inherited a dying business. Not one railroad operated a computerised reservations system. The majority of the cars were old and many were in disrepair. Too many of the stations had been neglected and were inefficient and unsightly. For the first two years, Amtrak was almost totally dependant on the railroads, leasing equipment from them and using their facilities. An Amtrak customer could make a reservation, buy a ticket and complete his journey without ever coming into contact with an Amtrak employee. Congress had given Amtrak only a two-year experimental period of life, with no fixed route structure beyond that time, and planning future improvements was excruciatingly difficult. Even Amtrak supporters were in disagreement about what Amtrak should become. Some wanted 150mph corridor [*population corridor, that is*] "trains of the future", while others called for the restoration of great long-distance "name" trains of the past which whisked passengers in pampered luxury in an atmosphere of soft sheets and linen table cloths.'

Unsurprisingly, the limping survivors of the US passenger train fleet looked little different in the first two years of Amtrak ownership, except that trains were a multi-coloured mixture of the 1,275 newer cars Amtrak had taken over from their previous owners until, from 1972, Amtrak started to repaint them in its new red, white and blue style with arrow-type logo. For traction Amtrak had to soldier on with 286 ageing E and F type cab diesels which the railroads had been happy to lease out after discontinuance of their own passenger operations, plus 40 Pennsylvania GG-1 electric locomotives. One must add, though, that the early Amtrak management itself, headed by an ex-airline executive, could be accused of pussyfooting failure to establish unequivocally with its administration sponsors whether it was supposed to be conducting a decorous burial service for the passenger train or accepting a challenge to reincarnate it.

The original Amtrak network of 23,000 route-miles between 21 pairs of cities was prescribed by the Transportation Department, though Amtrak was authorised to experiment elsewhere. In 1973 an amendment obliged the Transportation Department to add at least one route to the network for a minimum experimental period of two years per route, but from 1975 expansion was made a matter for Amtrak's discretion within the limits of its resources. Several services have in fact been added on new routes, such as the Chicago-Seattle 'North Coast Hiawatha', the San Francisco/Oakland-Bakersfield 'San Joaquin', the Boston-Buffalo-Cleveland-Chicago 'Lake Shore Limited' and the Salt Lake City-Boise-Portland-Seattle 'Pioneer'. In the summer of 1972, also, Amtrak was authorised to re-start international service to and from Canada and Mexico, and the Washington-Montreal 'Montrealer', Seattle-Vancouver 'Pacific International' and Fort Worth-Laredo 'Inter-American' were born. Other services, like the Chicago-Dubuque 'Black Hawk' and New York-Montreal 'Adirondack', have been brought to life under the Amtrak Act's license for States or regional agencies to arrange with Amtrak services over and above the basic network, provided that the contractors underwrite half the avoidable losses of running the trains, plus capital expenses for equipment, facilities or track maintenance.

From early 1972 onwards Amtrak was seen to be really trying. Besides the additional routes added to the network, frequency of service was augmented in some areas of the basic network, notably the key New York-Philadelphia-Washington sector of the North-East Corridor. Passenger trains were being intelligently marketed and promoted — 'We're making the trains fun to ride again' ran the most prominent ads — and ridership was slowly but perceptibly reviving, even though Amtrak's best efforts could so easily and often be nullified by unpredictable, disinterested and sometimes downright bloodyminded service from the trainboard staff of the different railroads it had to hire to man its trains. Operating staff, too, could smudge the image by giving their own railroad's freight trains priority over a single-line section, or stubbornly marshalling an observation car inside the consist.

This problem came into sharp focus in 1977 when Amtrak at last revolted at its treatment from Missouri Pacific and threatened to sue the railroad under the Federal law that enjoins the host companies to give Amtrak trains a fair deal operationally. Amtrak complained, for instance, of MoPac's 'phantom freights': Amtrak's 'Inter-American' was always halted in a lonely loop south of San Antonio, Texas, supposedly to cross a scheduled freight, but no freight ever appeared. For three months running delays were such that Amtrak had to lay on buses to ensure 'Inter-American' passengers made their connections on one trip in every four. It was alleged, too, that MoPac had delayed Amtrak services so heavily that on one



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occasion diesels ran out of fuel (whereupon naturally, the train's electrical auxiliaries were put out of action, stopping the air-conditioning), and on another the Amtrak crew had refused to work any more overtime, leaving the train stranded until reliefs could be mustered. Amtrak put down almost half its delays in MoPac territory to avoidable blockage of its trains by MoPac freight. Above all, although MoPac has some of the best quality track in the US, it has insisted that Amtrak trains obey the same 60mph limit as its own freight trains.

Nevertheless, by the early 1970s Amtrak's bridgehead was solidly established. A new Act of 1973 removed the uncertainties by extending Amtrak's existence indefinitely and locking every route Amtrak was then operating into law for a minimum of a year. The niggles mentioned in the previous paragraph were taken into account by a provision which based the levels of Amtrak's payments to its railroad hosts on the quality of operating service accorded its trains. A year later Amtrak was armed with authority to undertake its own maintenance and repair work; and a further Act of 1975 for the first time guaranteed Amtrak funds for more than one year ahead, at the same time making cash for capital improvements available as a straight grant rather than in Federally-guaranteed loans.

From 1972 onwards Amtrak was in a much happier state financially. In that year it was stunned by a benevolent Senate Appropriations Committee offer of

Far top left: *The US railroad industry's vision of supreme rail travel luxury in the mid-1940s. In 1944 General Motors got together with car manufacturers Pullman-Standard and advisers from the railroads to conceive a four-car 'Train of Tomorrow'. The spectacular set was outshopped in 1947, spent the next three years on a barnstorming exhibition tour of the US, then in 1950 was purchased by Union Pacific for Portland-Seattle service, which it performed until 1958. All four cars were domed, but given the special brand-name of 'Astra-Domes'.*

Top left: *A sleeping compartment under the dome of car* Dream Cloud*; this one is made up for daytime use, but at the rear one is laid out for the night. The two berths were end-to-end, laid lengthwise of the car, so that the seats faced the window.*

Far centre left: *The observation lounge; at the rear is the stairway to one of the 'Astra-Domes'.*

Far bottom left: Sky View, *the diner, had its upper floor laid out as a 'roof garden' restaurant. Vintage film buffs will recognise Alice Faye and husband Phil Harris, the bandleader, lending their familiar features to General Motors' publicity in this posed picture.*

Bottom left: *The ground-floor dining saloon of* Sky View.

Top right: *Day coach with reclining seats.*

Centre right: *The 'Top o' the Rail' cocktail bar was a feature of the observation lounge car: that is at the rear of this picture, with the low-level lounge beneath the dome in the foreground.*

Bottom right: *The upper floor of an 'Astra-Dome'.*

twice the amount it had diffidently sought in operating grants and guaranteed loan authority. By 1975 it was getting, under both heads, more than four times as much cash as in its initial funding year. By 1977, its annual operating grant was just over $480million, *twelve times* the inaugural 1971 figure.

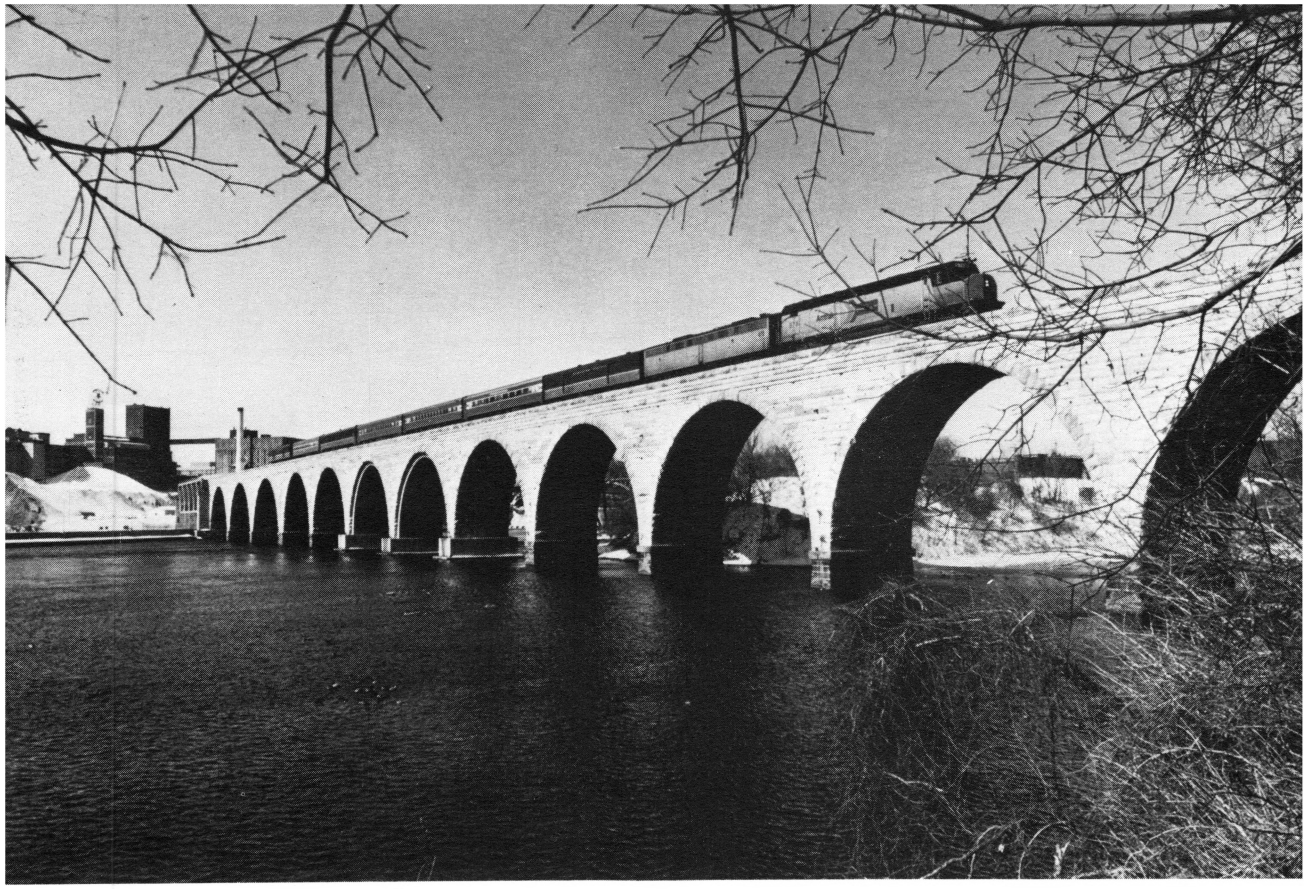
With cash in hand, Amtrak could start the desperately needed modernisation of its equipment. Revamping of the elderly E passenger diesels was halted in mid-stream, the Fs were written out of forward programming, and new models were ordered. First came 150 3,000hp SPD40F Co-Cos, a variant of a bonnet-front, full-width carbody design General Motors had first styled for Santa Fe in 1967. They were substantially off-the-shelf freight units tarted up for passenger work, partly so that Amtrak could find a ready sale for them if Washington pulled down the shutters on its operation.

These machines became Amtrak's standard long-haul power up to the mid-1970s, but their initially warm reception cooled to ice as they helped precipitate a financial crisis in mid-1977: more of that later. The SPD40Fs were equipped with steam generators to heat the inherited Amtrak passenger car fleet. As Amtrak's new coaching orders were to specify electrical auxiliaries, powered from the locomotive, two other new diesel types were acquired: 25 3,000hp P30CH Co-Cos from General Electric — again a derivation of a previous model — and 30 3,000hp F40PH Bo-Bos, a brand-new model from General Motors.

As for new passenger cars, Amtrak was well content with the Metroliner emus it had inherited on the former Penn-Central North-East Corridor electrified main line between New York and Washington. Whatever the traumas and miscalculations of this Government-sponsored demonstration project in its early days, with over-designed 150mph-capability mus grafted on to track that barely proved fit for 110mph maximum, it had settled down to hold a loyal, enthusiastic clientele. This was, in fact, one of the services that Amtrak had justifiably intensified, to 14 trains each way daily.

Above: *At its birth Amtrak was dependent entirely on equipment leased or bought from the railroads whose passenger services it had taken over. Here two EMD E8 diesels in Penn-Central livery head a New York-Washington train out of Boston's South Station.* / B. J. Cudahy

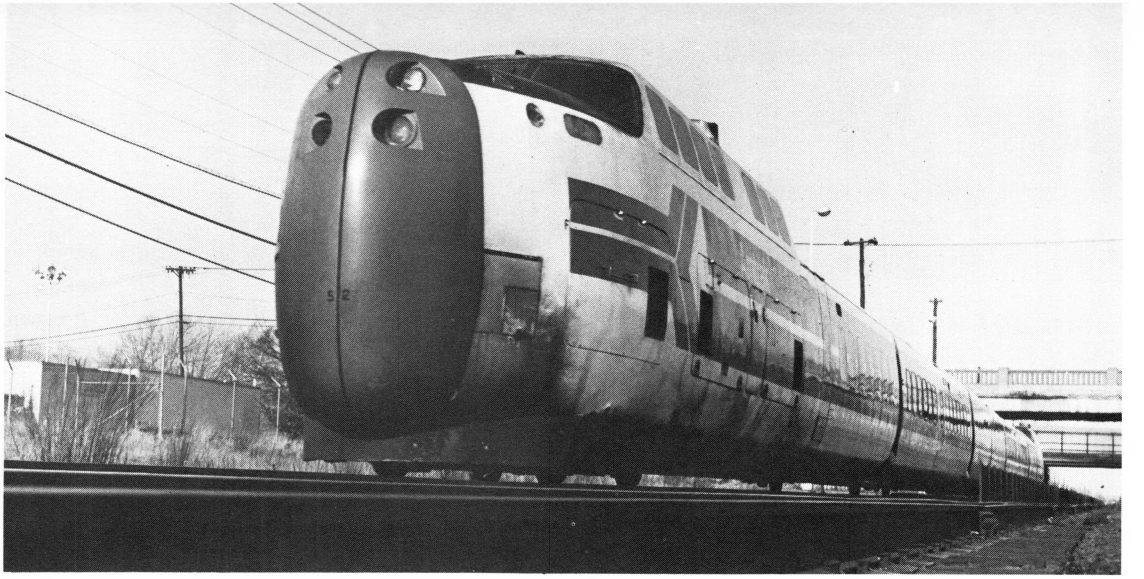
Above right: *The lead diesel unit is Amtrak's — one of the hapless SPD40F C-Cs now being rebuilt to four-axle units — but some of the cars are still in their original owners' livery. The train is the 'North Coast Hiawatha', rumbling out of Minneapolis across the Mississippi River.*



Since the Budd-built vehicles of the Metroliners had performed well, had designed ability to operate at 125mph or even more on suitable track and bodies adaptable to a range of internal layouts, they looked an admirable basis for design of a new short- and medium-haul fleet. Altogether, Amtrak ordered 492 cars to this pattern, ranging from day cars to lounges and including snack-bar and dining accommodation. Today the stock as a whole is brand-named Amfleet, within which the various types of car — to the disgust of the US buff equivalent of Great Western traditionalists — are categorised Amcoach, Amcafe, Amlounge, Amdinette, etc.

Amtrak's other modern short-haul tool is the gas turbine-powered mu. The Johnson administration's 1965 High Speed Ground Transportation Act, under which the New York-Washington Metroliner operation was sponsored and inaugurated in 1969, also introduced United Aircraft Corporation's unorthodox Turbotrain to a demonstration service between New York and Boston in the 1969 spring. South of the 49th Parallel the Turbos were prey to only a fraction of the technical flaws that harassed the sister units on Canadian National for years, and the two US units are still happily active.

Meanwhile French Railways was proving the economy and efficiency of gas turbine traction applied to orthodox railcar vehicle design in their 110mph ETG and later RTG multiple-units. An impressed Amtrak imported two RTGs for a two-year trial on its Chicago-Milwaukee and Chicago-St Louis routes from the summer of 1973, with an option to purchase and order more. When the strangers not only posted a mechanical reliability factor of over 90 per cent but won 50 per cent more traffic in their first year, Amtrak eagerly exercised its option. Four more RTGs were bought from the French builders, ANF-Frangeco, and seven more, distinguishable by facial changes, were contructed to the French pattern by Rohr Industries in California (at markedly higher cost than the French version, one might add, though Amtrak claim they are an improvement on the French-built units); Amtrak has also built and equipped two brand-new servicing depots for them, in Chicago and Albany, NY. Branded Turboliners by Amtrak, these gtmus radiate chiefly from New York and Chicago, almost monopolising the short-haul New York-Albany service and covering such rosters as the New York-Montreal 'Adirondack', New York-Buffalo 'Water Level Express' and Chicago-Detroit 'St Clair'. By 1978 Amfleet cars and Turboliners will have completely ousted pre-Amtrak stock from short-haul services.



Top: *One of the trio of United Aircraft Turbotrains in Amtrak service.* / B. J. Cudahy

Above: *A Metroliner speeds down the North-East Corridor under the old Pennsylvania 11kV ac catenary.* / Amtrak

Left: *One of Amtrak's French-built Turboliners, based on the French Railways RTG turbine mu design; similar units have been built by Rohr in the US for Amtrak.* / Amtrak

Above right: *A closer look at Amtrak's SPD40F: a pair of these 3,000hp units, derived from an EMD freight design for Santa Fe, power the Chicago-Seattle 'North Coast Hiawatha'. The train, including three dome cars, is a mixture of the now badly dated ex-streamliner cars Amtrak inherited and which it is eager to supersede with its new bi-level Superliner cars.* / Amtrak

Amtrak also has a keen eye on the latest technology devoted to lifting speed over sinuous track without passenger discomfort. It seems to have fixed on the Canadian version, the tilting-body, low-slung, diesel alternator-powered LRC (for Light, Rapid, Comfortable) developed by a consortium of Canadian industries; designed for 125mph, the LRC exploits aluminium alloy stressed-skin constructional techniques very extensively in its bodywork. Two LRC sets, each comprising a 2,900hp power car and five passenger coaches, have been acquired by Amtrak for two-year trial on the Vancouver-Seattle-Portland route. After initial tests, Amtrak purred that one of these LRCs rode very comfortably at almost 90mph through curves restricting orthodox equipment to 60mph.

For its long-haul business from Chicago to the West Coast Amtrak worked out a completely new vehicle design with builders Pullman-Standard. Double-decked, the new cars, which Amtrak has named Superliners, resemble the Hi-Level cars which Budd built for the Santa Fe, but Amtrak's new stock is more advanced technologically. Higher than the Santa Fe vehicles by 7½in, the Superliners make maximum use of both floors for passenger accommodation and thus have greater capacity, but at the same time they are lighter and better on payload because their all-electric auxiliaries are locomotive-powered. The cars have built-in 120mph capability and are mounted on air-cushion suspension bogies of German design.

Amtrak is buying no fewer than 249 Superliners, undaunted by a price tag that inflation-linked clauses in the contract have lifted to nearly £500,000 a car. The versions ordered include mixed class sleepers, with first class rooms upstairs and economy class berths below, all-economy sleepers, standard day cars, diners and so-called Sightseer-lounges. These last are Amtrak's successor to the popular Dome cars, with a fully-glazed roof covering a relaxing lounge upstairs and a cafe/bar lounge on the lower floor — the only drawback being that because all Superliners have the same roof height there is no fore-and-aft panoramic view from the observation lounge as there was in the domes. Unhappily, labour disputes and technical troubles have dogged the Superliner programme and at the start of 1978 entry into service was still awaited.

The new equipment so far described, plus 26 new 6,000hp E60CP electric locomotives from General Electric to supersede the classic Loewy-styled Pennsylvania GG1s under the North-East Corridor catenary, committed Amtrak to an outlay of some £340million. But Amtrak was not satisfied. Still more Superliners were needed to extend re-equipment to trains like the Chicago-Texas 'Inter-American' and 'Lone Star', the Chicago-Florida 'Floridian' and Chicago-New Orleans 'Panama Limited'. Tunnel clearances in Eastern cities like New York and Baltimore bar the Superliners, and they will not fit under catenary, so there is need too of about 350 more new single-level cars, including sleepers, to complete the coach fleet renovation (as a stopgap Amtrak has expensively converted some former Union Pacific sleepers and diners with electrical auxiliaries so they can work with its latest traction on the 'Night Owl', 'James Whitcomb Riley', 'Panama Limited' and 'Montrealer'.) More diesels and electrics are wanted, and soon a second-generation Metroliner. All in all, Amtrak has been pressing to spend a further £340million by 1982.

On top of all that, Amtrak now has its own railway to run, lock, stock, staff and trackbed. In the spring of 1976 it bought the entire North-East Corridor route from Boston via New York to Washington, 456 route-miles, plus the 103 route-miles from Philadelphia to Harrisburg.

The chain of events that brought this about started

Amtrak
Amtrak

with the bankruptcy of Penn-Central in 1970. Within a few years six or seven more Eastern railroads were insolvent and Washington was confronted by the real possibility of a total rail shutdown in the North-Eastern states. The Regional Rail Reorganisation Act of 1973 created the United States Railway Association (USRA), mandated to salvage a rational system from the wreckage by any device short of full-blooded nationalisation. USRA's solution was to set up a quasi-governmental organisation, Consolidated Rail Corporation or Conrail for short, to manage a truncated network from which duplicate and hopelessly uneconomic facilities would be trimmed. Conrail was enshrined in the Railroad Revitalisation and Regulatory Reform Act of 1975, popularly known as the '4R', which also solved the North-East Corridor dilemma by offering the route to Amtrak for purchase.

The North-East Corridor was a thorny issue because, unusually for a US inter-city route, its traffic was so predominantly passenger. Of the 960 trains operated daily over its lines, just over two-thirds are commuter services, 120 Amtrak and 170 Conrail freight. Penn-Central was too strapped for cash to keep the track in proper fettle for the Metroliners, so with the formation of Conrail a reversal of roles seemed sensible: let Amtrak be the landlord and Conrail and the various regional transport authorities sponsoring commuter services be the tenants.

The Ford administration, steadily more antipathetic to Amtrak, fought a rearguard action on the issue, arguing strenuously for an Amtrak lease from Conrail; but Amtrak eventually won the day with Congress on the counterclaim that an annual rental would aggravate its deficit and deprive it of the plenary powers it needed to ensure a consistently high-standard inter-city service. So Amtrak took possession of the track, 107 stations and various maintenance facilities for a buccaneering price of around £50million — to the outrage of Penn-Central's luckless creditors and stockholders, who howled to their legislators that USRA's assessment of the route's fair liquidation value represented less than a tenth of the per-mile costs of the new Metro then building in Washington.

Amtrak had been hankering after a sweeping reconstruction of the North-East Corridor route to transform it into a 160mph super-railway, for roughly 40 per cent of all Amtrak passenger journeys are in the North-East. By the mid-1970s, however, the costs of that pipedream had soared to staggering levels. The Ford administration flatly rejected the extravagance, but it did endorse the grant of an additional £900million (10 per cent of it to come from States served by the line) to upgrade the whole Boston-New York-Washington route for 125mph. That money, added to cash already advanced, gave Amtrak a total of around £1.65billion to spend on modernising the corridor.

This still mammoth job was started in 1977. Over 1,000 track-miles must be totally rebuilt (on concrete sleepers, by the way, to the fury of the suppliers who till now have persuaded practically every US railroad to persist with wood). That is essential to overtake years of skimped maintenance and realign some 50 curves. Hundreds of bridges demand thoroughgoing overhaul, or even replacement in the case of 150 erected before 1895.

Most importantly, almost the whole route is to be electrified at the national grid supply standard of 25kV 60-cycle ac; that involves conversion of the ex-Pennsylvania and New Haven 11kV 25-cycle catenary from Washington to New Haven, with concomitant rebuilding of the New York and Baltimore tunnels and bridges elsewhere to secure additional clearances, and electrification from scratch between New Haven and Boston. Total cost of this conversion is put at about £150millions. One says 'almost' the whole route is to be electrified at 25kV because the New York area's Metropolitan Transportation Authority has won a fight to pursue 12½kV 60-cycle conversion of the territory it covers as far as New Haven; that will force Amtrak to employ triple-voltage traction (units will also have to cope with the old 11kV 25-cycle current of the Conrail system in the event of an emergency diversion). When it is all over, the objective is a New York-Washington transit time of only 2hr 40min for the 225 miles, inclusive of intermediate stops, and of 3hr 40min for the 233 less friendly miles, topographically, from New York to Boston, again inclusive of stops, all at hourly frequency.

Multiple-units for the rebuilt North-East Corridor may be American through and through, but the locomotives will derive from European practice. The General Electric E60CP Co-Cos had an ill-starred induction and soured Amtrak-GE relations in the electric traction area; following an early derailment the class was grounded while the running gear underwent modification and GE had to stump up substantial compensation for failure to meet delivery deadline. Here again, the design is derived from a freight unit built for the Black Mesa and Lake Powell industrial line in the South-West, mounted on heavyweight diesel-type bogies.

Top left: *A four-axle F40PH, EMD's other design for Amtrak, heads a baggage car and four Amfleet cars out of Chicago on a Detroit service. Compare the sober interior of Amfleet cars, shown below, with those of the great streamliners of yore on pages 85, 88 and 89!* / B. J. Cudahy

Far centre left: *Basic Amfleet — the equivalent of European second-class in an Amcoach.* / Amtrak

Centre left: *Amclub is the equivalent of European first-class.* / Amtrak

Far bottom left: *The Amlounge has 32 seats at table for hot and cold meal service.* / Amtrak

Bottom left: *Snack bar service in an Amcafe.* / Amtrak

Above: *Amtrak President Paul Reistrup leans from the driver's window of the ASEA-built Swedish Railways Type Rc4 Bo-Bo electric that was impressively tested in the North-East Corridor and which is to be the basis of a new American-built design for this route.*

Below: *Amtrak's first new electric locomotives were the General Electric E60CP Co-Cos, again a freight locomotive-based design; this one is powering Amfleet cars through Elkton, Maryland, in the North-East Corridor.* / Amtrak

Top right: *Amtrak's new stations are modest affairs: this one is at Richmond, Virginia.* / Amtrak

Centre right: *An artist's impression of a Sightseer/lounge car to come in Amtrak's new bi-level Superliner fleet.*

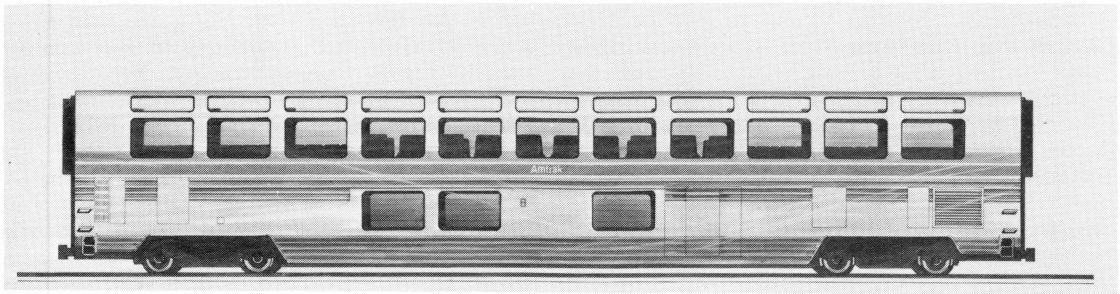
Bottom right: *Impressions of a 'family' sleeper compartment and an upper-deck observation saloon in the coming Superliners.*

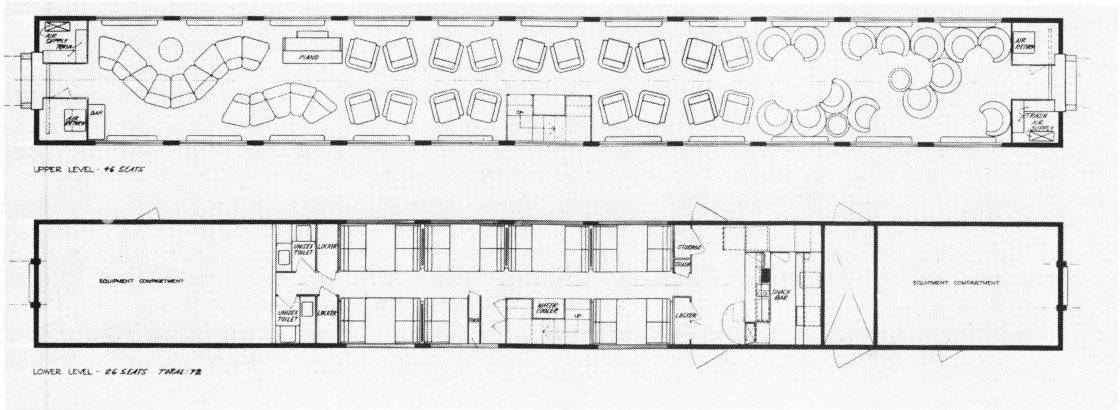
In the summer of 1976 Amtrak imported two European locomotives for trial. One, French Railways' multi-voltage Co-Co No CC21003 returned home quite soon after a derailment and a couple of 'dewirements'; its suspension did not take kindly even at 80 mph to indifferent US track and was virtually incapable of modification because of the very restricted clearance in the quill drive to its axles. But the Swedish Railways, ASEA-built Type Rc4 Bo-Bo with thyristor control captivated the Amtrak brass. Weighing far less than the hulking E60CP, it seemed capable of all but equalling the latter's performance with the — by US standards — comparatively modest loads of Corridor inter-city expresses, though not on standard loads elsewhere. In early 1978 it was announced that a design embodying much of the Rc4's technology would be built in the US under licence.

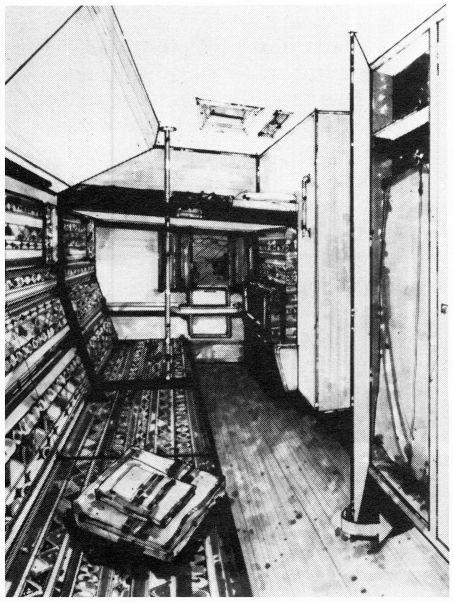
One should perhaps add that Amtrak has purchased other property under the 1975 Act, notably 83 route-miles from Michigan City, Ind, to Kalamazoo, Mich, which it has been upgrading from 60 to 79mph track speed. Moves into station real estate include 50 per cent ownership of Chicago Union station and the Washington Terminal Co. Elsewhere it has persuaded State and city authorities to contribute to improvements: for example, Michigan has helped fund a £3½million renovation of the Chicago-Detroit track, while affluent Dallas bought and modernised its station for Amtrak entirely out of its own municipal pocket.

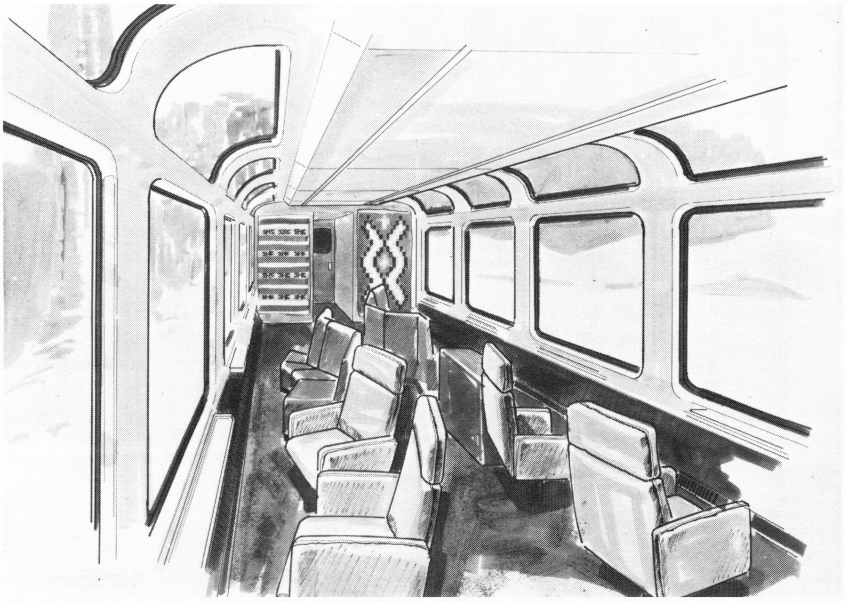
Against this glowing background, then, has the US passenger train, revitalised almost at the grave's mouth, anywhere to go but onward and upward? No

Amtrak
Richmond


Amtrak


PIANO
BAR
AIR EXTEN.
TRACK & SUPPLY
UPPER LEVEL - 46 SEATS
EQUIPMENT COMPARTMENT
UNISEX TOILET
LOUNGE
STORAGE
SNACK BAR
WATER COOLER
UP
EQUIPMENT COMPARTMENT
LOWER LEVEL - 26 SEATS TOTAL: 72





doubt about it, despite still variable service — even in the course of one long-haul journey — because of dependence on so many non-Amtrak trains as well as operating staff, and though schedules are mostly pedestrian by Western European standards, patronage has revived on many routes. The upsurge has been spectacular on some lines after introduction of new equipment — within a whisker of 100 per cent, for instance, after Amfleet cars' debut on the Los Angeles-San Diego route. Young people especially are 'into trains' as a new travel experience.

But as yet not a single Amtrak service is in the black. Only a handful — the Metroliners, Chicago-Milwaukee short-haul trains and the popular New York-Florida trains in particular — are meeting their direct running costs. Long-haul trains like the Chicago-West Coast Services are heavy loss makers. Cheer-led by President Ford's cynical Transportation Secretary William Coleman and brainwashed by incessant knocking copy from the bus operators, some American opinion by the mid-1970s was questioning whether it was right the taxpayer should in effect be shelling out a dollar and a quarter for every dollar Amtrak was taking in revenue.

Fortunately Amtrak now has a president, onetime Baltimore & Ohio RR passenger service director Paul Reistrup, whose logic and enterprise carries conviction not only in transportation but also with opinion-makers and legislators. In an acrimonious — and publicly so — confrontation with Coleman and his deputy over budgets in late 1975, when Reistrup was accused of playing politics for spelling out Beeching-fashion the specific routes Amtrak must throw over if it was not adequately financed, Reistrup smoothly rallied influential Senators to his side. The Transportation Department was brusquely told to stop worshipping the dollar.

Although the Carter administration has made soothing noises, at the time of writing it has yet to show its hand fully (though Carter personally has sharply criticised the scale of current Federal spending on what he stigmatised as 'grossly overdesigned' new US urban rapid transit railways). Apart from a need of grants to meet operating losses at a rate already exceeding £500,000 a day and threatening to top £1million a day by 1980, during the same period Amtrak wants to undertake capital investment that amounts to as much as a third of current spending by all other US railroads put together, even though Amtrak's total train-miles are no more than a tenth of the freight train-miles run in the US.

By the middle of 1977 Amtrak was already about £40million adrift on its operating budget for the year and there were forebodings of technical bankruptcy and service cuts unless the Administration came across with emergency aid. To some relief, after earlier noises implying that the budget-conscious Carter regime was likely to get really tough, the Administration proposed a $500million budget for 1978, only about $24million below Amtrak's request. But Congress moved to trim the total, so Amtrak promptly countered with a whole sheaf of service reductions — the most drastic to hit US passenger services since Amtrak's formation. Not even the North-East Corridor timetable was immune from cancellations. That startled Congress into moves to restore the cash it had refused, and most of the Amtrak economies were cancelled.

Two factors precipitated Amtrak's 1977 crisis. One was the phenomenally Arctic North American winter of 1976-7. To quote a summary of events in the monthly *Trains:* 'As temperatures dropped below zero, steam generators failed, Metroliners and Turboliners lost power, fuel congealed, switches froze, water pipes burst in cars. Trains were terminated short of their destinations, sometimes annulled outright. On 19 January Amtrak decided to suspend some of its system to sustain the remainder'. It annulled until further notice all trains on six 'lightly-travelled' routes and suspended some trains on three others. Besides these specified trains, though, many others which should have run were immobilised on any number of January days. The revenue forfeited was appalling.

Meanwhile a timebomb had been ticking away and now exploded to crumble more of Amtrak's composure. In late 1976 a spate of derailments had hit the big SPD40F diesels and many railroads now slapped crippling speed restrictions on the bulky Co-Cos. A limit of no more than 40mph over curves of 2deg or more had such catastrophic effect on schedules that from the spring of 1977 as much as 7hr had to be added to the schedule of the Chicago-Pacific Coast 'North Coast Hiawatha' and 2hr to the timing of the Chicago-Seattle 'Empire Builder'. When research pinpointed the cause of the SPD40Fs' discomfiture as incompatibility of the machines' bogie design and suspension with express passenger speed over curvature in the prevailing state of US track maintenance, Amtrak had to embark on a formidably expensive reconstruction of the whole class as lighter Bo-Bos similar to the later F40PHs from General Motors. On top of all that, the new Amfleet cars were plagued by teething troubles — and even when it did secure reasonable availability, Amtrak was as yet short of the later diesel models equipped to operate the electrical Amfleet auxiliaries.

These recent woes notwithstanding, the American passenger train is certainly alive again. But despite a thoroughgoing transplant in its North-East Corridor and blood transfusions of new equipment elsewhere, it's much too early to be certain the US is witness to a reincarnation rather than a temporary reprieve.

North Eastern Freight

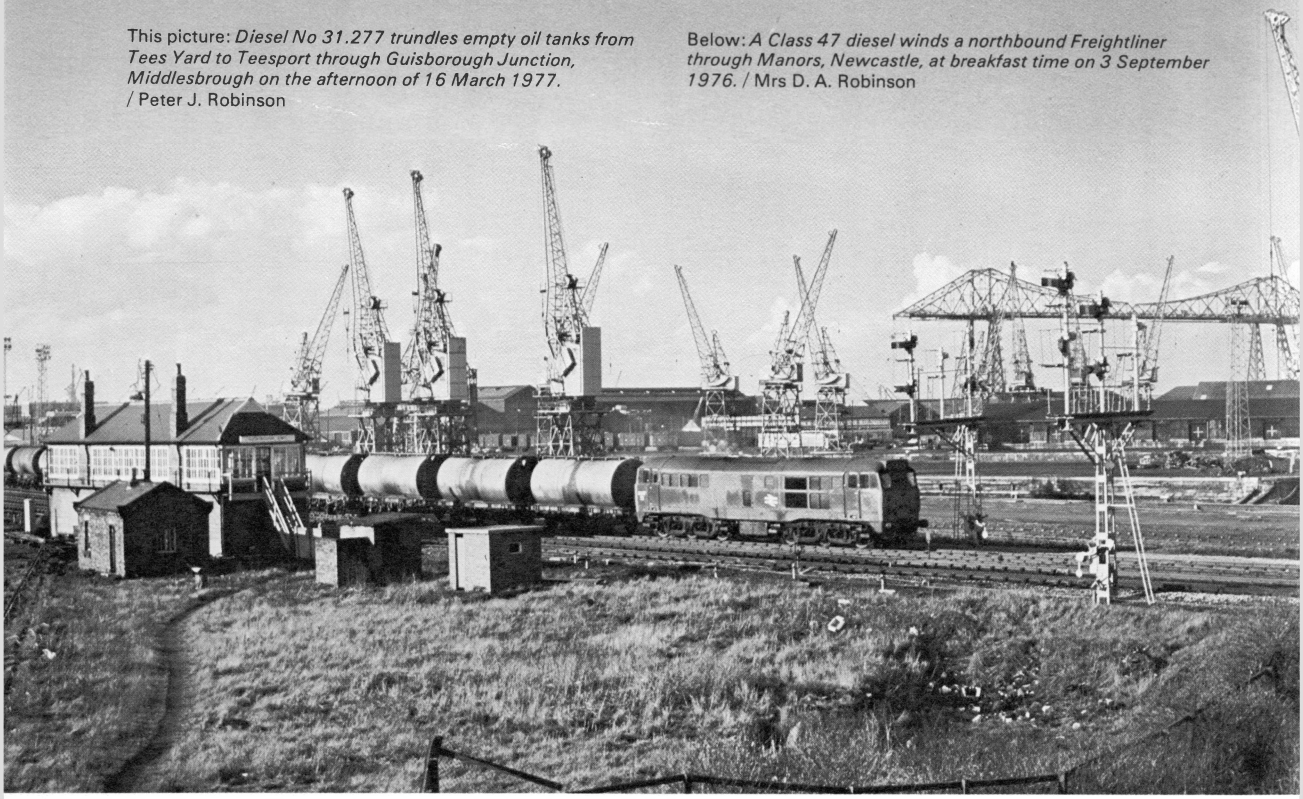
An industrial interlude

Above: *A circuit train of high-capacity bogie wagons conveying iron ore from the Redcar terminal to Consett passes the British Steel Corporation plant at Lackenby behind diesels Nos 37.002 and 37.193 on the morning of 15 March 1977.* / Peter J. Robinson

This picture: *Another diesel of the same type, No 37.249, heads empty Presflo wagons southwards out of Newcastle from Heaton to Eastgate past Ouston Junction on 29 July 1976.* / Mrs D. A. Robinson

This picture: *Diesel No 31.277 trundles empty oil tanks from Tees Yard to Teesport through Guisborough Junction, Middlesbrough on the afternoon of 16 March 1977.* / Peter J. Robinson

Below: *A Class 47 diesel winds a northbound Freightliner through Manors, Newcastle, at breakfast time on 3 September 1976.* / Mrs D. A. Robinson



The 'Northern Belle' of the 1930s

The luxury cruise train that offered a week's tour of Britain for just £20

K. HOOLE

Perhaps the best bargain in rail travel ever offered by a British railway company was the 'Northern Belle' train operated in the 1930s by the LNER. It was the nearest Britain has ever come to realising the old cliché 'hotel on wheels'. Quite simply, the LNER styled the train as a land cruise. For a week 60 passengers lived on the train in luxury, taking most of their meals on it, sleeping on it and enjoying a number of side-trips by road and steamer from various stopping points along the route to tourist attractions not directly served by rail. All this for just £20 a head!

The first train left Kings Cross on 16 June 1933. Thereafter the 'Northern Belle' ran three or four tours in June and early July each year until the outbreak of war in 1939. At first the itinerary took in a number of English resorts — Saltburn, Whitby and Scarborough — but these were dropped after the first year, although the Lake District was included until 1935. After that the whole tour was focussed on Scotland, centred mainly on Ballater and then moving to the west coast, but still starting and terminating at Kings Cross.

On the first tour of Friday 16 June 1933 the train left Kings Cross at 11.20 and ran to Edinburgh, where the day was spent viewing the Castle, Holyrood House — and the Forth Bridge — ending with a dinner and dance at the North British Hotel. Saturday night was spent travelling to Aberdeen, with a five-hour halt near Montrose, and Sunday was fully occupied exploring the area around Aberdeen, with the chance of a game of golf at the company's Cruden Bay Hotel. On Sunday night the train was worked south to Dalmeny, then across to Glasgow and on to Balloch Pier for a steamer trip along Loch Lomond to Ardlui: there passengers rejoined the train to continue the journey to Fort William and Mallaig. Part of Monday night was spent back at Fort William before leaving for Melrose, via Edinburgh, to inspect Abbotsford, the home of Sir Walter Scott, and the abbeys at Melrose and Dryburgh. Continuing along the Waverley Route to Riccarton Junction the 'Northern Belle' then followed the Border Counties line to Humshaugh, where motor coaches took the travellers to the Roman Wall. The train was rejoined at Hexham and the day ended at the Royal Station Hotel at Newcastle.

On Tuesday night/Wednesday morning the train ran via Durham, Bishop Auckland, Barnard Castle and Kirkby Stephen to Penrith for a day's motor coach tour of the Lake District; then the passengers rejoined the train at Tebay for the long journey back across Stainmore Summit to Darlington and Saltburn for dinner at the Zetland Hotel and a night halt. Thursday's journey was to Whitby and Scarborough, with time allowed for sightseeing at both East Coast resorts, and the day ended with another dinner and dance, this time at the Royal Station Hotel at York. The final day, Friday, was spent running from York to Kings Cross, with halts at Lincoln and Ely to view the cathedrals.

In 1934 (and probably 1935) the tour was via Harrogate (motor tour), Ripon, Barnard Castle, Penrith (Lake District tour), Edinburgh, Aberdeen (motor tour to Balmoral and Braemar), Balloch Pier (steamer to Ardlui), Fort William, Mallaig, Craigendoran (steamer trip on River Clyde) and back direct to London via Edinburgh.

The coaching stock used was specially chosen. For the first year the train was composed of 15 vehicles, including two brake vans for passengers' luggage. However, it was found that only one was required and thus from 1934 the train was made up of the following 14 vehicles, or their equivalents:

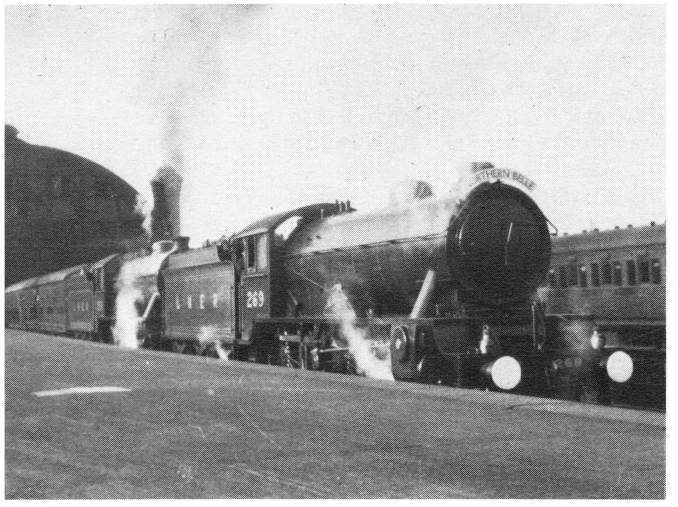
Coach A: brake first 4206, with five compartments, for staff accommodation.
Coach B: Sleeping car 1342 with eight four-berth compartments, for staff.
Coach C: Kitchen car 42183. This was one of the first British all-steel kitchen cars, built at York in 1914 for the 'Flying Scotsman': cooking was by gas. This vehicle was originally ECJS No 213, becoming LNER 1213, but in July 1929 it was transferred from East Coast to Great Northern Section stock and renumbered 42183.
Coach D: Open first 1220 for dining.
Coach E: Open first 1221 for dining.
Coach F: 1007, originally an eight-compartment third built at York in 1924, but fitted with a hairdressing compartment in 1928 and a cocktail bar in 1932. The remaining compartments were used as the train office by the officer in charge of the train.
Coach G: Saloon 46 was the oldest vehicle in the train as it was built in 1912 as a Great Northern family saloon: in the 'Northern Belle' it was used to provide a writing room, smoking room, and ladies' room.
Coach H: The night portion of the train was made up

Above: *Class A4 Pacific No 4489* Dominion of Canada *'casts off' from Kings Cross for a 'Northern Belle' cruise on 18 June 1937.* / E. R. Wethersett/Ian Allan Library

Right: *Class K3 2-6-0 No 17 brings the day portion of the 'Northern Belle' into Barnard Castle; the sleepers are at the adjoining platform.* / Colling Turner Photomatic

Below right: *The 27 train staff of the 'Northern Belle' pose at Aberdeen with ex-North British Atlantic No 9876* Waverley.

Below: *The 'Northern Belle' about to depart from Darlington for Saltburn behind Class D49 4-4-0s Nos 269* The Cleveland *and 255* The Braes of Derwent. / J. W. Armstrong



of six ten-berth first class sleeping cars, three of them having shower compartments, and the six cars were marshalled alternately so that there was a shower compartment in the centre of each pair, which meant that each shower served the ten berths on each side of it. Each pair of berths in all six cars could be made into two-berth compartments by opening the communicating door. Coach H was sleeper 1165 with shower.

Coach J: Sleeping car 1317.
Coach K: Sleeping car 1166 with shower.
Coach L: Sleeping car 1318.
Coach M: Sleeping car 1167 with shower.
Coach N: Sleeping car 1319.
Coach O: Brake van 171 built by Cammell Laird.

This added up to a train weight of 512tons tare, with a total length without engine of 885ft 6in.

A staff of 27 — male and female — was employed on the train to look after the wellbeing and comfort of the 60 passengers. Although breakfast and lunch could be provided from the train kitchen, dinner was usually taken at one of the company's hotels.

It may look simple when set down in a few lines of print, but the tours were a triumph of organisation. Feeding and sleeping 87 passengers and staff for a week required a large amount of planning, especially when their temporary home was always on the move, not to mention the replenishing of such mundane items as gas for cooking, electricity for lighting, water, laundry, etc. The bedclothes were changed daily and the dirty linen sent off to the nearest LNER laundry, to be picked up clean three days later at some convenient stop.

At times the day and night portions were worked separately, so that while one was carrying the passengers, the other could be run to the nearest carriage sidings for cleaning, re-victualling, battery charging etc. For instance, take the arrangements for 1936, when the tour started off from Kings Cross (dep 21.00) to Aberdeen (arr 09.30 Saturday). After a full day exploring the Scottish countryside the passengers rejoined the night portion of the train at Aberdeen for departure at 23.15 for Ballater (arr 00.30 Sunday): the empty day portion followed at 23.35 from Aberdeen. On the Sunday morning the passengers breakfasted in the day portion at Ballater and then left on a coach tour of Deeside, including Balmoral. During the Sunday the night portion was worked empty to Aberdeen and back for cleaning, etc, arriving back at Ballater at 17.00.

Sunday night was also spent at Ballater and on the Monday morning both portions were worked independently to Aberdeen, where they were again united for the journey to Perth (arr 14.04), continuing empty to Glenfarg at 18.30. After travelling by road from Perth to Glenfarg the passengers rejoined the train and spent the night there, before leaving at 06.10 on the Tuesday for Dalmeny. In the meantime the day portion had left Glenfarg at 23.30 on Monday for Craigentinny carriage sidings at Edinburgh, where cleaning and maintenance took place; then it moved off at 06.45 on Tuesday to rejoin the night portion at Dalmeny.

The whole train then ran to Balloch Pier to allow the passengers to join the steamer for Ardlui at the northern end of Loch Lomond. After returning to Dumbarton, the train was again split and the night portion sent off empty at 09.55 for Fort William. The day portion followed at 10.10, empty to Ardlui to pick up the passengers, and then forward at 12noon to Fort William and Mallaig (arr 16.15). After only 40min at Mallaig they were on their way back to Fort William (arr 18.44), where Tuesday night was spent in the train.

Next morning the passengers transferred to the day portion for breakfast and the night portion left empty at 08.35 for Cowlairs (arr 00.36). The day portion followed at 09.18 from Fort William, dropping the passengers at Crianlarich for a coach tour to Craigendoran, followed by a steamer trip on the Clyde. The empty day portion continued from Crianlarich to Cowlairs, and then the combined train was worked back to Craigendoran to pick up the passengers before departing at 21.30 for Wednesday night's halt at Corstorphine, on the outskirts of Edinburgh.

On the Thursday morning, after the passengers had left for a day in Edinburgh, the combined train was worked from Corstorphine to Craigentinny carriage sidings for washing and cleaning, and a supply of gas and water, before being taken in two parts to Waverley station in the early afternoon so that passengers could rest their weary bones if they so wished before the final dinner at the adjacent North British Hotel.

Departure from Waverley was at 00.05 Friday and, with a two-hour halt at Dunbar, the triumphant 'Northern Belle' regained Kings Cross at 10.45 with 10¼hr available to get ready for its next journey.

A spare kitchen car and an open first were available for replacement purposes if required at Edinburgh and Aberdeen, and a replacement sleeping car was held at Fort William. To conserve water, gas and electricity the staff was instructed to avoid unnecessary use during the cruise.

Two engine headboards lettered 'Northern Belle' were provided and had to be used throughout the tour. However, when the train was running divided only the portion conveying passengers wore a headboard. On at least one occasion when the train was being worked double-headed both engines were noted carrying a headboard!

To work a 14-coach train weighing well over 500tons required special motive power arrangements, particularly over some of the branches where trains of that size were not normally seen. It had already been mentioned that on occasions the train was split so that one portion could be cleaned and maintained, but there were times when it had to be split because the combined train was beyond the capacity of even two engines. In fact, on occasions each portion had to be worked by two locomotives. Combinations noted on the complete train included J39 0-6-0 + K2 2-6-0 on the Border Counties line, two K3 2-6-0s from Wetherby to Harrogate and two D11 4-4-0s from Craigendoran to Edinburgh; and, on the day portion only, two D49 4-4-0s from Saltburn to Whitby and Scarborough, and two D34 4-4-0s on the West Highland line and the Mallaig Extension. To and from Kings Cross Gresley Pacifics were usually used, such as A3 No 2751 *Humorist* from Doncaster, via Lincoln and Ely, on the last leg of the first cruise in 1933, and A4 No 4902 *Seagull* on the first leg of the inaugural cruise of 1939. In 1935, after the passengers had spent the day touring the Lake District, the train was worked from Penrith to Carlisle over LMS metals by LMS 4-6-0 No 6100 *Royal Scot.*

The oldest engines to work the train were the J21 0-6-0s used on the day portion between Barnard Castle and Penrith, and from Tebay to Darlington, in 1933. Only recently a retired Locomotive Inspector recalled to me the long day he spent as a driver on the inaugural trip of the 'Northern Belle' on 21 June 1933, when he was instructed to work the following duty:

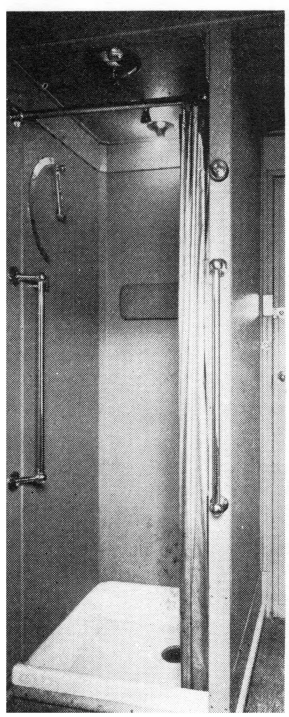
	arr	*dep*	
Darlington shed	—	07.45	Light engine
Barnard Castle	08.20	09.00	Day portion loaded
Kirkby Stephen	09.48	09.53	Day portion loaded
Penrith	10.46	11.53	Day portion empty
Kirkby Stephen	12.46	15.10	Day portion empty
Tebay	15.40	16.20	Day portion loaded
Kirkby Stephen	16.43	16.48	Day portion loaded
Darlington	18.05	—	Day portion loaded

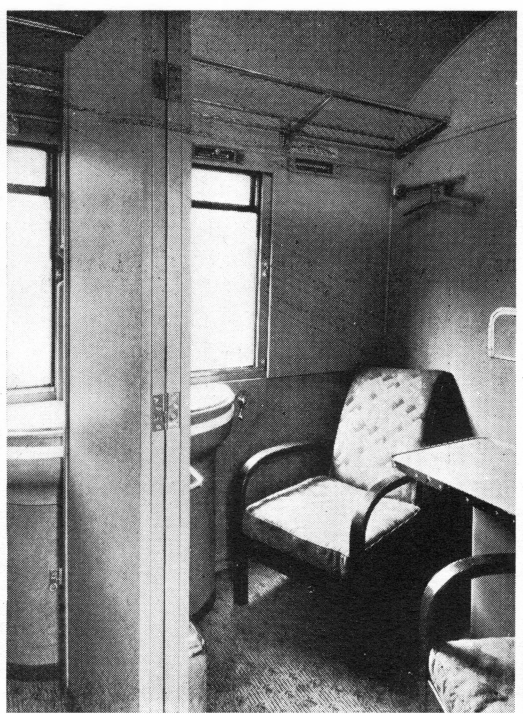
The combined train was then worked forward to Saltburn by D49 4-4-0 Nos 269 *The Cleveland* and 255 *The Braes of Derwent.*

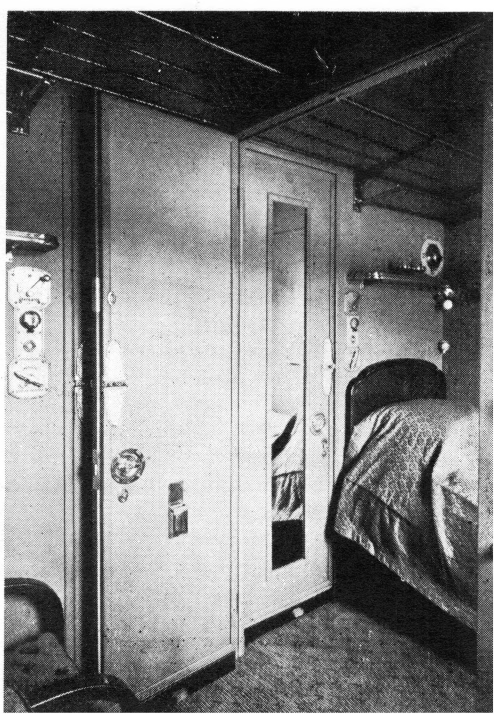
The popularity of the 'Northern Belle' — which, even if it made four trips in a year, could carry only 240 passengers — induced the weekly paper *Scout* to arrange a similar tour for boy scouts, at a fare of only £5 5s per head. This train was made up of 12 coaches, of which six were third class 28-berth sleeping cars. Another ex-ECJS kitchen car of 1914 vintage was turned out, but because of the extra mouths to feed an additional restaurant third was included in the make-up. This tour ran once a year from 1935 to 1939 and the route changed slightly each year, but usually included a trip over the Forth Bridge in both directions en route from Edinburgh to Glasgow and Fort William, accomplished by reversing at Inverkeithing.

The first train left Kings Cross on 28 April 1935, headed by A3 Pacific No 2750 *Papyrus*, which only a few weeks earlier had achieved 108mph on a special Kings Cross to Newcastle and return test run. On the last leg of the cruise on Sunday 5 May the train was hauled by A1 No 2570 *Tranquil.* When it last ran on 9 April 1939 it left Kings Cross behind A4 No 4489 *Dominion of Canada* and arrived back a week later behind V2 2-6-2 No 4818 *St Peter's School York AD 627.*

The luxury sleeping car of 1932 that was included in the 'Northern Belle', showing its shower and two adjoining compartments opened up to form a suite.







Ordeal by 'Orient Express'

It wasn't like this in Agatha Christie's day

PAUL CLARK

Images used to flash through the mind at the very mention of the name 'Orient Express' — James Bond, *Stamboul Train*, murder and intrigue, cosy smoking rooms and chandeliers. When I heard the famous train was to cease operation as a through service from Paris to Istanbul from 22 May 1977, the temptation to experience for myself its fabled mystique was irresistible and so, packing siege rations of sandwiches and fruit, I joined the 15.30 from Victoria one rainy afternoon during the last week of operation. From Victoria there was a through connection to Paris Nord, whence three coaches were shunted to Gare de Lyon. There the Direct-Orient proper started its 2,000odd-mile trek to Asia at 23.53 nightly.

Unfortunately I travelled on one of the nights when no sleeping car was included in the Istanbul portion. Indeed, the only part of the train destined to reach the shores of the Bosphorus was one second class SNCF compartment coach — *Voiture* 100. That was just the first shock on a journey of three days and three nights which was utterly to shatter my illusions of the 'Orient Express'. Admittedly I would probably have taken a different view had I been able to travel *Wagon-Lits*. But I was to be subjected to three nights of cramped hell, often overwhelmed by noisy Italians, drunken Yugoslavs, and rowdy migrant Turks journeying to their homeland from Germany.

To be fair, the train left Paris conveying a passable clientele. It did not take too long to discover that I was the only passenger making the through journey to Istanbul. The first morning saw us traversing Switzerland and through the Simplon Tunnel to arrive at Milan around midday.

During that morning I made two more discoveries. First, there was no running water in any coach I could reach from *Voiture* 100. Second, there was no refreshment car on the train. The lack of water was not too serious as the tanks were to be topped up often during the journey. The lack of refreshments, though, was to be quite a problem. To preserve my siege rations, I bought as much food as I could during the stop of one hour at Milan.

At Trieste considerable mayhem ensued as the train was crammed full of sweaty Italians and Yugoslavs. It was now dark throughout the train — presumably somebody had forgotten to turn on the lights. After an awfully cramped night with two hours' sleep, I shared a breakfast of dry biscuits with my non-English speaking fellow travellers in a misty Yugoslavia. Even if there had been a restaurant car I would not have been able to reach it, for both ends of *Voiture* 100 were firmly locked for no apparent reason and the toilets were again devoid of water. I was still only halfway through my siege rations, so at least I was assured of a lunch on my second day. Belgrade was the next large station and there I managed to stock up on Cokes and chocolate. The empty Coke bottles were to prove invaluable as I could now obtain water from station fountains en route.

I was refused permission to take photographs in Yugoslavia and Bulgaria and the austere formality of the Communist countries was making itself felt. The continuous and imperious request for *Passporte!* and *Billet!* by inconsiderate and often armed officials was irritating, to say the least, and my baggage was turned out twice at the Yugoslav/Bulgarian border town of Dimitrovgrad. I was so thirsty at this point and the water fountain opposite my window so inviting that I could not resist jumping down at the frontier station with my empty Coke bottle to refill — only to be promptly ordered back on the train by an armed official.

There was one redeeming aspect of the second day; I had found a Canadian called McGuire en route to India who had joined the train at Belgrade. Realising I had not heard the English langauge for two whole days I was keen to strike up a friendship for the last leg of the journey. By the time we arrived at the Bulgarian capital of Sofia both he and myself were very hungry. I elected to comb the sprawling new station for food and very nearly missed the train as a result. I changed travellers cheques, bought some dry bread and cold sausages for an exorbitant sum, and after losing my way several times, made the train by a bare thirty seconds. My second evening meal on the 'Orient Express' was actually bread and water, but McGuire saved the day by producing a skin containing whisky and Coke which we calculated ought to last to Istanbul.

There was one more fright that night. McGuire jumped down at an obscure Bulgarian station to refill the Coke bottle from the fountain and was about to do so when the train started moving. I yelled at him and he just made the handrail as I grabbed his arm and pulled him in.

The third night on the train was to be somewhat easier, as I had the blissful luxury of stretching out on the metal luggage rack. It may sound rough, but after

Above: *Not a diplomat, sinister Oriental or veiled vamp in sight as a melancholy-looking 'Direct-Orient Express' prepares to leave Milan behind Italian State Bo-Bo-Bo electric No E646.063 on 10 May 1977.* / Paul Clark

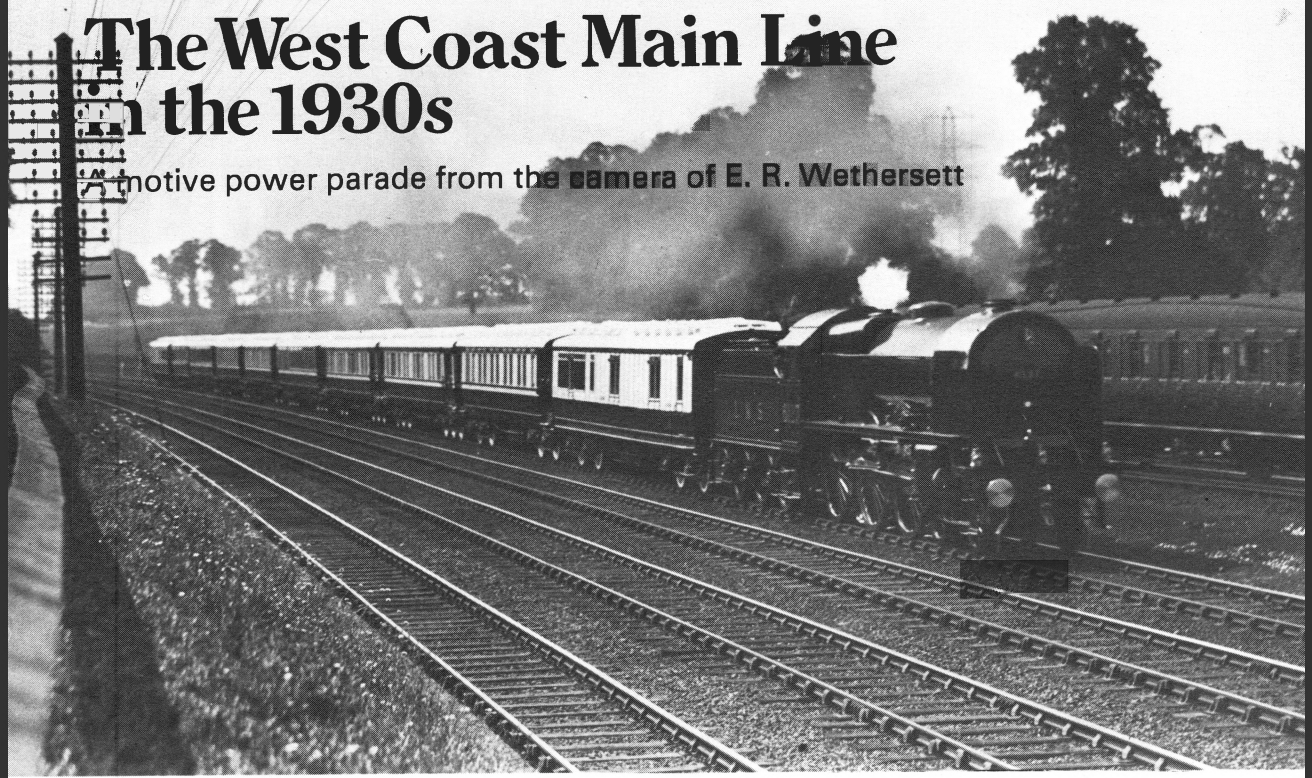
Below: *After three days and nights on the road from Paris, the through coach from the French capital ends a weary journey in the 'Direct Orient/Marmara Express' at Istanbul's Sirkeci station behind Turkish State Railways Co-Co diesel No 18.012 on 12 May 1977.* / Paul Clark

being cramped up for so long it was heaven itself! The next morning saw us in Turkey and running some five hours late. I had been saving the last of my siege rations for this morning, as I was determined to have a breakfast on my last day on board the 'Orient Express'. Much to my surprise I pulled out a marmalade sandwich, which was still edible if a bit crushed. That, together with an apple I had been saving since Venice, boosted my morale considerably. I jumped down to attempt to photograph the train at the Turkish outpost of Kapaca, but before taking up a position had to run back as the train had started moving after the briefest of stops. This first excursion on to Turkish soil produced a surprise. The 'Orient Express', which had left Paris as a main line train, was reduced to three coaches and about 20 freight wagons calling at all wayside stations.

During the afternoon of the third day we finally pulled into Sirkeci Station, Istanbul. Great was my relief as I stepped on to the platform knowing the marathon was over. I could only wonder what it must have been like to arrive at Istanbul in the heyday of the 'Orient Express'. What I had seen was not the ceremonial funeral of a great train, but the last pitiful throes of an anachronism's lingering death.

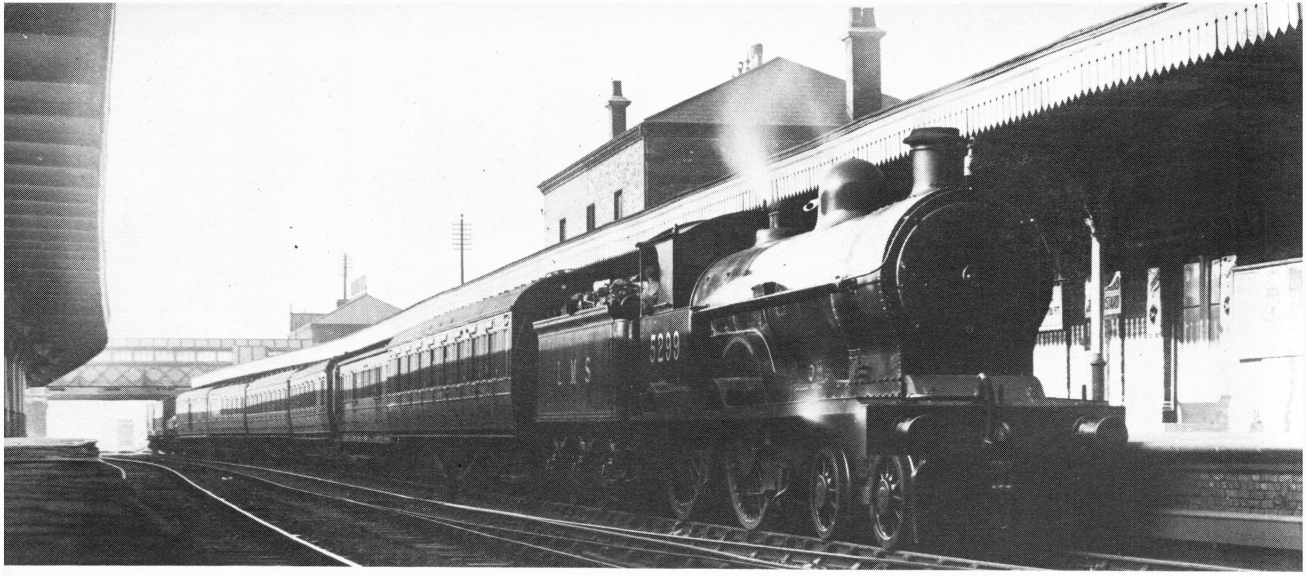
The West Coast Main Line in the 1930s

A motive power parade from the camera of E. R. Wethersett



Above: *King George V and Queen Mary travel to Edinburgh on 9 July 1934. The Royal Train of former LNWR stock, still in LNWR livery, had left Euston at 10.25 and was photographed approaching Bushey behind 'Royal Scot' 4-6-0 No 6127* Novelty *(later to be renamed).*

This picture: *Heading a Manchester express over Bushey troughs on 16 May 1936 was another of the original 'Royal Scot' 4-6-0s, No 6125* 3rd Carabinier, *recently renamed; it was originally* Lancashire Witch, *honouring — like* Novelty *— an early steam locomotive.*



Top: *In the early 1930s ex-LNWR power was still plentiful in the route's London suburban area. Here is 'Precursor' 4-4-0 No 5299* Vesuvius *pausing at Willesden Junction with a Bletchley-Euston train of mixed stock in October 1932.*

Above: *An exclusively London North Western line-up of motive power in Watford shed yard on 25 March 1932.*

Left: *Today it's a job for nippy Class 310 emus, but very early in 1930 this Euston-Tring local is steam-powered by ex-LNW 4-4-2T No 6794, making for Kings Langley.*

Above right: *Compound 4-4-0s still had taxing assignments, particularly on the fast Euston-Birmingham trains: No 1189 is tackling at least 10 bogies on this down relief passing Carpenders Park on 11 May 1935.*

Right: *As late as 1934 you could still catch an unrebuilt LNW 'Claughton' 4-6-0 on the main line: No 5989 hurries an up express over Bushey troughs on 3 June 1934.*

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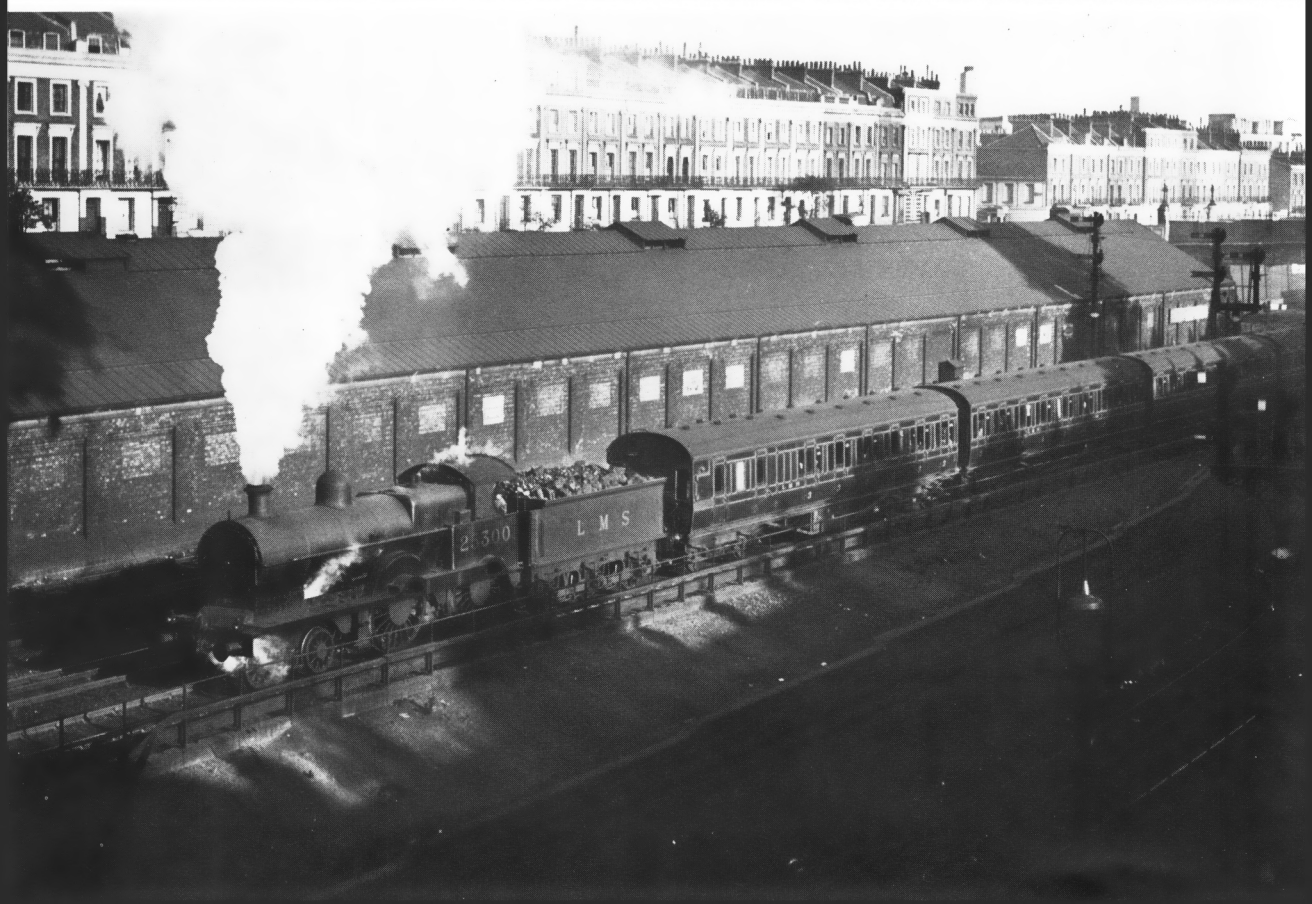
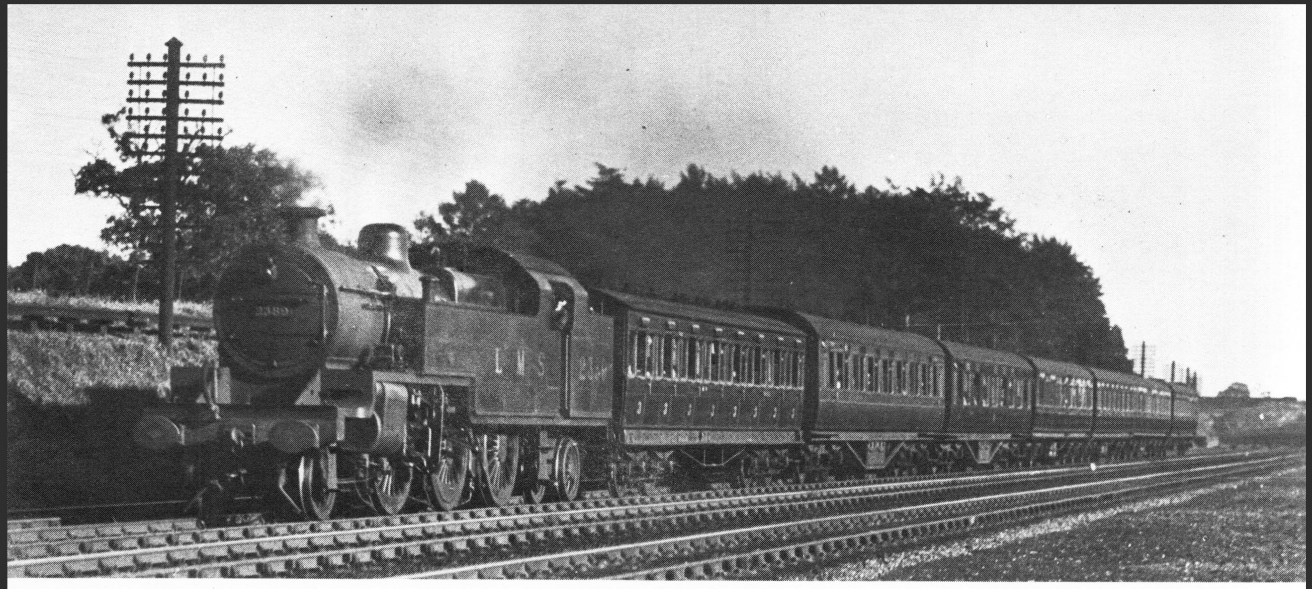
This picture: *Ex-LNW 'Prince of Wales' 4-6-0 No 5671* Arethusa *makes a call at Willesden Junction with a Northampton-Euston semi-fast on 1 November 1931. Not until 1933 were the first of this 245-strong class withdrawn.*

Below: *By 1938 there were 2-6-4Ts of modern design in plenty, but on 28 September that year homegoing commuters on the 17.00 Euston-Bletchley went up Camden bank behind a labouring ex-LNW 'Precursor' 4-4-0, No 25300* Hydra.



This picture: *Almost on the eve of war big-boilered 'Claughton' 4-6-0 No 6004, with recently-added smoke deflectors, barks huskily through Kilburn High Road with a Camden-Birmingham freight on 19 June 1939. It lost its name* Princess Louise *in 1936, but managed to survive the 1948 nationalisation into 1949, though it never carried its allocated BR number of 46004.*

Above: *No 5975* Talisman *was one of the ex-LNW 'Claughton' 4-6-0s rebuilt with both big boiler and Caprotti valve gear; it looms over the bufferstops of Euston's No 1 platform on 9 September 1931.*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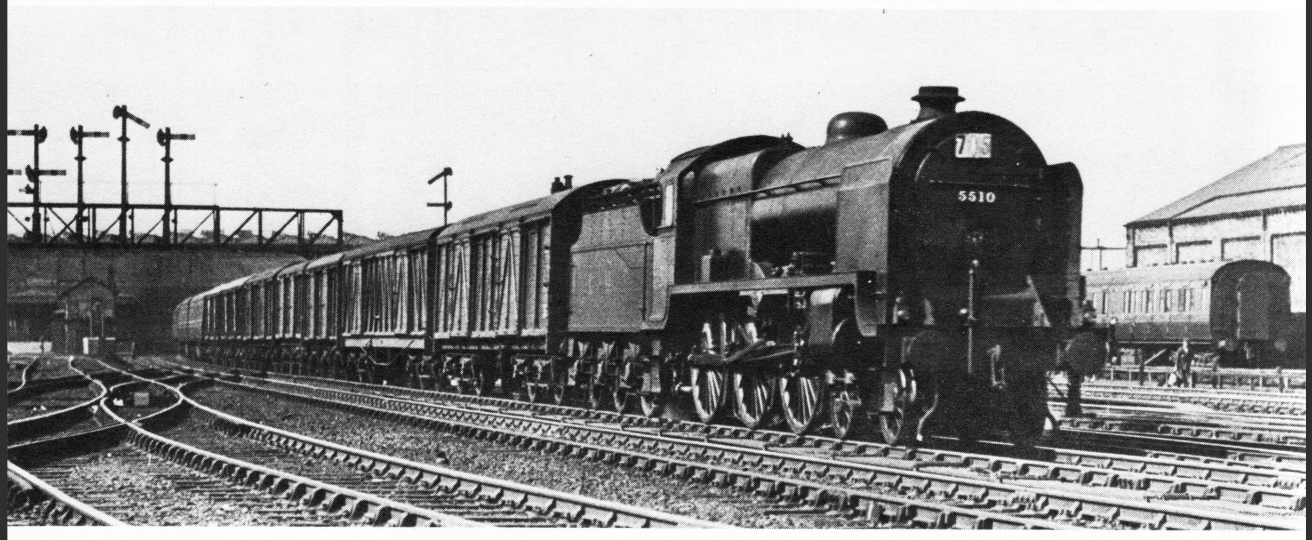
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Top left: *The Fowler look on Euston's commuter services: 2-6-4T No 2389 bustles past Carpenders Park with a Euston-Bletchley stopping train, the leading vehicle of which appears to be a former L&Y coach: how odd it looks nowadays to see a compartment coach with a '3' on every door!*

Centre left: *No longer seen are the weekend theatrical specials that moved the props and costumes of touring companies from one engagement to the next: here is one passing Willesden Junction on Sunday 22 March 1936 behind 'Patriot' 4-6-0 No 5510.*

Bottom left: *Stanier three-cylinder 2-6-4T No 2504 had not been many months in service when it was photographed emerging from Watford Tunnel with a Euston-Tring commuter train on 5 August 1935. For most of their subsequent careers these three-cylinder engines were associated with the Tilbury line.*

Below: *Also in the early months of its career was still unnamed 'Jubilee' 4-6-0 No 5652 heading a Leicester excursion out of Euston towards Bushey on 10 August 1935. Behind its first two ex-LNW coaches the train included several Midland clerestory coaches, among them a twelve-wheeler.*

Bottom: *It's Jubilee year and so the specially black-liveried and chromium-embellished 'Jubilee' 4-6-0 No 5552* Silver Jubilee *is kept in good trim: it is on Euston-Northampton semi-fast duty on 10 May 1935, passing Kilburn High Road.*

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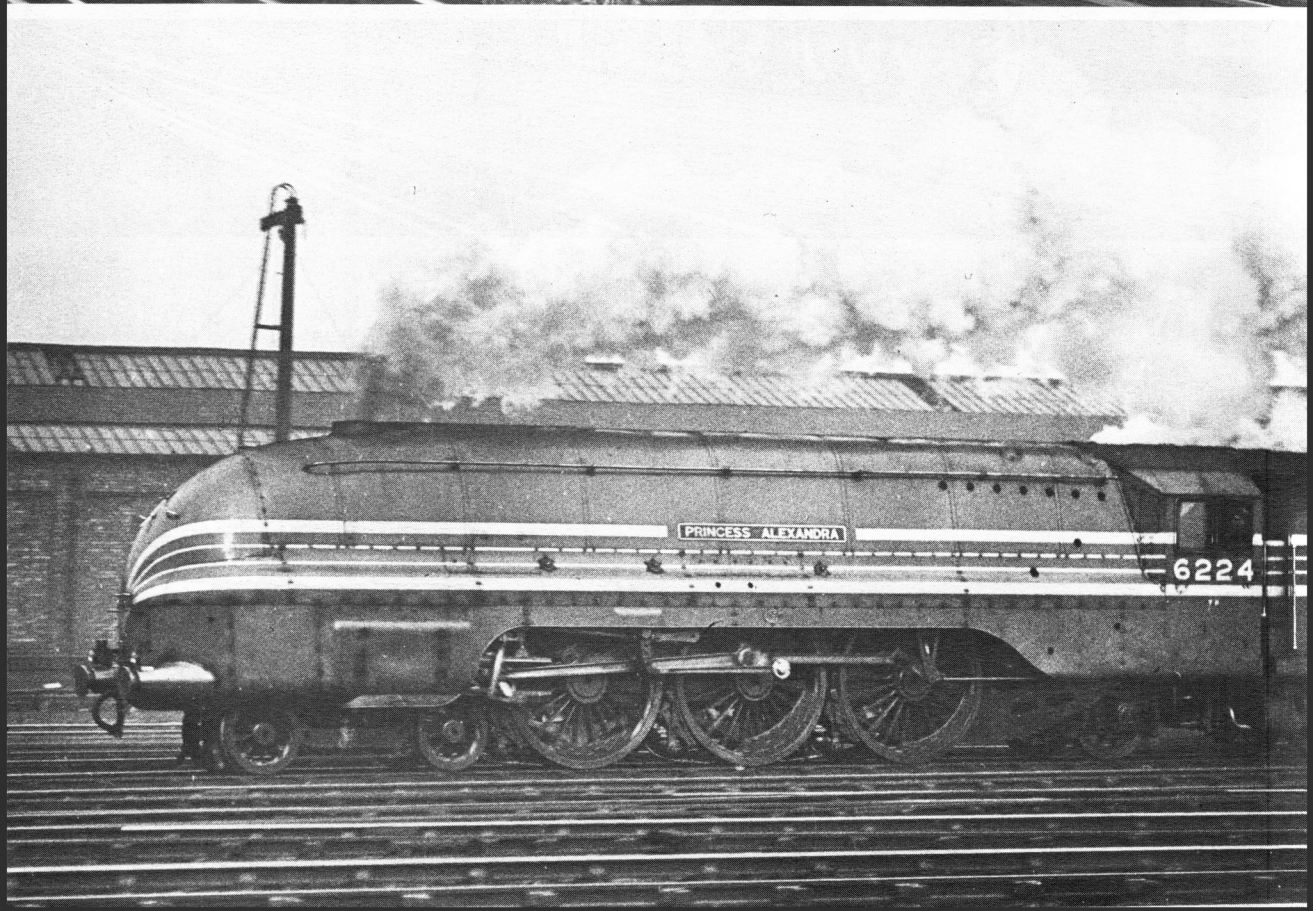

PRINCESS ALEXANDRA
6224

Above left: *Enter the Stanier Pacifics. 'Princess Royal' No 6206* Princess Marie Louise *heads the evening down 'Merseyside Express' through Bushey on 6 August 1938.*

Left: *The streamlined 'Coronation Scot' had its premiere in 1937 and on 24 February the following year the camera panned on blue-liveried No 6224* Princess Alexandra *hurrying the Glasgow-bound train through Willesden.*

Above: *'Princess Coronation' No 6234* Duchess of Abercorn *was brand-new when she headed the 10.05 Euston-Perth past Kilburn High Road on 24 September 1938. This was the heroine-to-be of the February 1939 heavy-load tests over Shap and Beattock banks when, newly fitted with double blastpipe and chimney, she lifted a 20coach, 610tons-gross load over Beattock at 63mph southbound — and in the teeth of a snowstorm.*

This picture: *Presumably the unique Turbomotive No 6202 had suffered one of its not infrequent breakdowns on a northbound Euston-Liverpool service when it was discovered one 1935 day at Bushey, ignominiously trundling back to London tender-first on empty stock.*

The London Road Show

A Mancunian remembers the days when GC 2-4-2 tanks rubbed shoulders with 'Royal Scots'

R. KEELEY

Three major railway stations were the corner stones of the approximately triangular-shaped central area of Manchester. Of the three, two remain in use. The third exists as a structure but gapes empty of rails and life. Each has its own identifying character, as unique now as in the days of pre-group ownership. Even the now desolate Central commands attention, its huge empty shell brooding over the city's eastern approaches.

Victoria is comfortably urbane, though still managing to exude the muck-and-money atmosphere of Lancashire and Yorkshire industry. The intricately decorated stone facade, blackened but exquisite, is all front and no back. It somehow suggests the Victorian terraced houses with their two up and two down, where the best furniture and the antimacassars were in the front parlour, concealing the yellow sink and stone floor of the back kitchen.

London Road was — and its successor still is — stamped with the Premier Line hallmark. At one time the old square-cut administrative block, formidable as the Bastille, frowned down the long straight approach road and seemed to proclaim 'enter at your peril'. But it concealed a kinder, if still somewhat stern interior. Within the grand, opulent booking hall there was suggestion of obsequious ministration to the passenger's every need.

London Road had from its early days played host to other railways. In the 1890s the principal client was the Manchester Sheffield & Lincolnshire, then flexing its muscle under the great Edward Watkin. Its coming struggle for the capital was to last through Great Central and LNER days — a sort of David and Goliath situation; but this was one David who would finally succumb to the giant.

The green engines from the east never had more than foothold at London Road, not even in LNER days. They were allowed just three platforms, lettered A B C, then a roadway and iron railings, as if to keep the contenders apart. To buy a ticket, whether it be for Marple or Marylebone, you were relegated to pigeon-hole windows in a long draughty passageway on the eastern edge of the great stone office block. The contrast to the ornate ceiling, the polished wood and tiered balconies of the spacious main entrance hall was stark.

The station, a dark gloomy place when I first became familiar with it in the mid-1930s, had, like many of its great contemporaries, a generous share of soot-encrusted heavy iron railings and long lines of smoke-blackened columns. The cramped circulating area, which could not have changed much in half a century, was bisected by an access road for parcels and newspaper vans. The aspect of stone paving and cobbles together with the grey, steamy atmosphere was more appropriate to the age of the hansom cab and carriage. The tiny glimmerings of change were there but it would be a couple of decades or so before the old order was overwhelmed.

Imagine, then, that you are standing at the buffer stops on platform B, your attention caught by the 'Director' 4-4-0 now bustling under the roof canopy. With a dull boom, she rumbles the length of the platform — too fast you may think, but not so: with a slight grind of brakes she stops importantly by your side. Doors slam as passengers stream away and the aristocrat on the footplate benignly views the dispersal of his flock. Suddenly a great roar from lifting safety valves reverberating around and across the lofty curving roof spans reveals the presence of a 'Scot' at a far platform. The fury is brief. It abruptly drops to a sizzle, now overborne by the metallic creak of a porter's trolley trundling to the guard's van of the Sheffield train. Then steam erupts again as an LNW 'Precursor' tank starts a local for Buxton; the sound echoes in the roof, then is lost as the engine finds the open air beyond the canopy. Any shortcomings in the appearance of the London Road buildings were more than compensated by the interest of their contents. These were LNER-LMS days, but pre-group locomotives still predominated in the station.

I usually made my way to London Road from Belle Vue. This was a onetime Great Central/Midland joint station with very long platforms and bays, evidence of the considerable excursion traffic that once used the station, as it was very conveniently placed for the nearby zoological gardens and amusement park.

Local services, mainly to Hayfield, were largely the province of ancient diminutive ex-Great Central 2-4-2 tanks hauling equally vintage carriages. Some of the stock was of six-wheeled, but surprisingly comfortable for all that. The seating was usually a red plush and very bright and attractive — there just isn't enough red these days. The ancient upholstery sagged a little here and there and sometimes you would sit down to a 'da-doing' as groaning springs disturbed the dust of time.

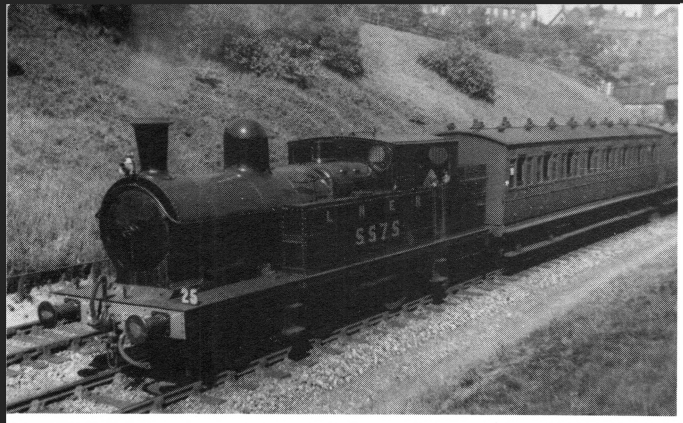
These elderly 2-4-2s were sprightly little things, brisk enough to shame present-day dmus. They would shoot up the cutting towards Ashburys Junction and occasionally come to an abrupt grinding halt at the protecting signal. This was quite a good place to stop, since it gave a fine view of the approach lines to Belle Vue shed. This ex-Midland roundhouse occupied space in the V-shape formed by the Marple/Hayfield branch and the main line to Sheffield, which could be seen on a rising gradient beyond the shed. Further over still were the approach lines to Gorton, the whole scene dominated by the huge mechanical coaling plant which served this famous motive power depot. I would be craning my neck to spot the couple of 3F 0-6-0s and the 'Crab' 2-6-0 standing beside Belle Vue roundhouse, when the reason for the delay would come racing down the bank and across the junction. A lovely sight in delectable apple green, it would be one of the GC four-cylinder 'Valour' class 4-6-0s, *Lord Stuart of Wortley*. The Gorton staff kept these engines in spotless condition. A shame such an Achilles heel lurked beneath the firebox, congesting it with ash to deaden the life-giving fire. However, I knew nothing about the problem then and I doubt if the drivers of the 'Princes' and 'Georges' at London Road did either.

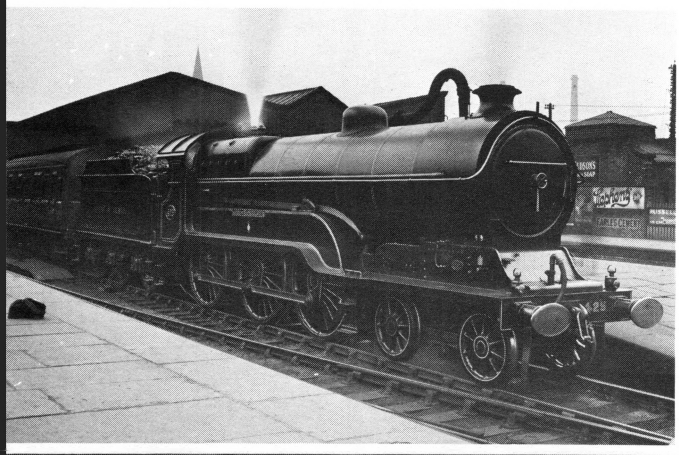
Once the express was clear of the junction the tank would accelerate quickly over the few hundred yards to Ashburys station. Between here and the half-mile or so to the next station at Ardwick the view northward was dominated by massed ranks of vans and wagons, some bearing strange Continental names. Interpolated amongst the persistent clanging of buffers one could catch the occasional wheezing of an ancient Great Central 0-6-2 tank.

Ardwick, on a rather acute curve, brought the LNER lines parallel to the LMS main line, which they accompanied into London Road. The first station out of the terminus, it was and still is a marvellous vantage point to see the great trains. As it was only about three-quarters of a mile out, the engine would be beginning to get a grip, either head-down and starting to sprint if it was a tank with three or four on, or breaking into a canter if it was a 'Scot' with fifteen in tow. A 'George V' 4-4-0, shouting furiously, charged along like a bull elephant. But a 'Patriot', perhaps on the 'Lancastrian', would gently, inexorably, roar — in waltz time, of course.

The 2-4-2 would now be into the straight with the arched roofs of London Road in sight. We could even find ourselves running alongside a Fowler 2-6-4 tank. At that the Gorton driver might get an extra spurt out

'Even on the sunniest day you arrived under the glass canopy of London Road in gloom' — mid-afternoon on 11 October 1953, with Class 7P 4-6-0 No 45540 Sir Robert Turnbull *simmering in the background.* / C. R. L. Coles





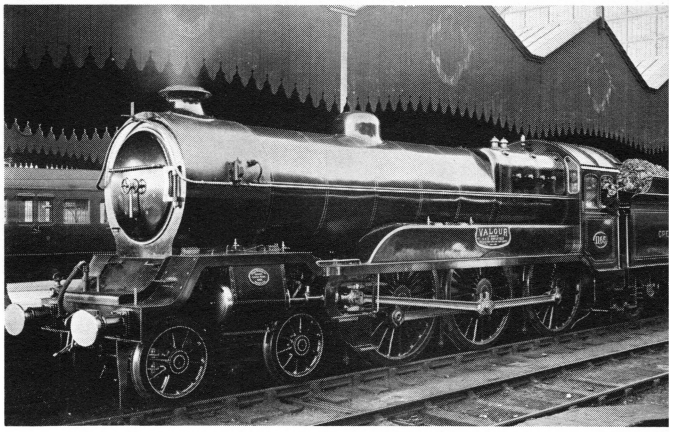
of his ancient warrior. The Gorton drivers ran the little 2-4-2s very hard and had a genius for running fast to a station stop; indeed you sometimes wondered if they wouldn't need to set back. The Great Eastern Liverpool Street suburban was not the only electrifying service.

Even on the sunniest day you arrived under the glass canopy of London Road in gloom. The roof remained for ever smoke-blackened — well, not quite for ever; I will talk about the transformation later. London Road was really three stations, with Mayfield separately named, though it was part of the complex. Its variety, while not quite rivalling Carlisle or York, was considerable. The products of at least five pre-grouping companies could regularly be seen, as well as most of the modern passenger locomotives of the LMS.

The main terminal station, covered by four sections of arched glass roof, dealt with most of the LMS main line and suburban services and main-line traffic to Sheffield, Eastern Counties and London. Mayfield was a sort of overflow station, built by the LNWR in 1910 to ease congestion in the main building. Dividing London Road and Mayfield were the through platforms used by the Altrincham electrics, a local service to Liverpool and some transfer goods workings. Into this slot of two through tracks, crossing east to west the immediate city centres, would eventually be inserted the key to unlock economies

which would close Central. Just two tracks, the small station at Oxford Road plus modern traction was to make one of the superb train sheds in the country redundant almost overnight.

A lengthy footbridge at London Road, invaluable to both enthusiast and passenger, connected all platforms, then entered a metal tube to leap the busy Fairfield Street and enter Mayfield through the brick sidewall of the station. In the mid-1930s that footbridge was the gateway to treasures which in the 1970s are like an Arabian Nights dream and equally inaccessible. On the LNER platforms the Great Central/Robinson look predominated, though the 'Sandringhams' were beginning to put in a showing. On the LMS the LNW black was dominant, but most of the London trains were now the preserve of 'Royal Scots' and 'Patriots'. It was the LNW 'Claughton' 4-6-0 that really had me spellbound — not the original version, though I am convinced a more beautiful locomotive never graced the portals of London Road, but the reboilered variety which I knew and loved for a few fleeting years. *Vindictive*, *Breadalbane*, *Talisman* are names that always spring to mind, inset on brass nameplates adorning locomotives then painted in crimson lake. Paradoxically I find it hard to see these engines in any other than this traditionally Midland colour. I certainly cannot imagine them in North Western black, even though they started life in the spartan North Western livery. Reboilering completely transformed them. Gone was the anaemic look which, at least to my eyes, seemed to beset all LNW engines. Now we had a machine that still had the North Western style but managed to look massive and



Top left: *'The elderly Great Central 2-4-2Ts were sprightly little things'* — *Class F1 2-4-2T No 5575 leaves Mottram with a pre-World War II stopping train for Manchester London Road.* / R. Atkins

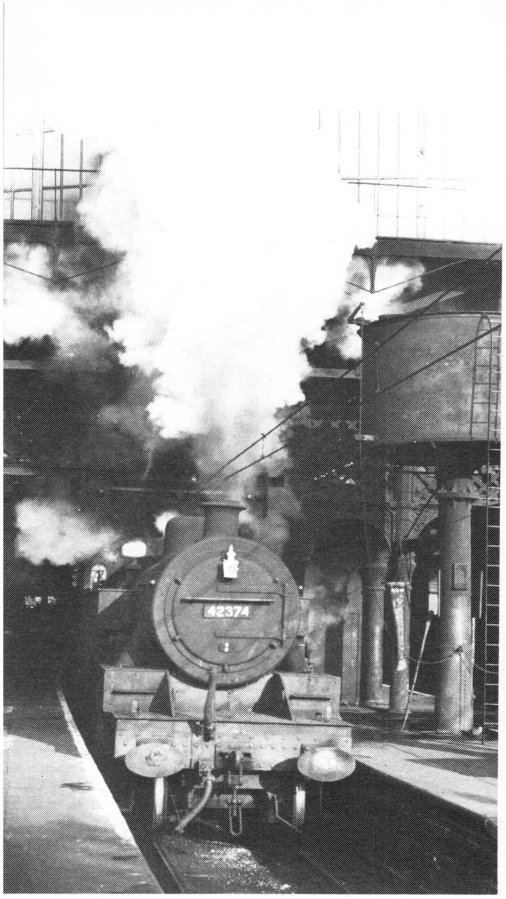
Centre left: *'The "Sam Fays" looked magnificent'* — *this one, Great Central No 425* City of Manchester, *was photographed at London Road before the Grouping in 1923.* / Ian Allan Library

Bottom left: *'The Great Central monopoly would last'* — *a post-nationalisation scene at London Road, with ex-GC Class C14 4-4-2T No 67441 shunting empty stock. In the background a 'Britannia' Pacific gathers strength for the Euston run.* / Eric Treacy

Top right: *Electric takeover of the ex-LNER express service. 1.5kV dc Co-Co No 27004 heads a London Marylebone express out of London Road to the Woodhead route. The service is now defunct and the locomotive sold to the Netherlands Railways.* / Eric Treacy

Centre right: *'A shame such an Achilles heel lurked beneath the firebox'* — *the four-cylinder No 1165* Valour *of the Great Central herself, in another pre-Grouping shot.* / Ian Allan Library

Bottom right: *'The A5 4-6-2Ts were real aristocrats, exuding the Robinson breeding in every line and curve'* — *No 69823 hurries an afternoon Manchester London Road-Macclesfield Central train past Marple on 8 September 1956.* / T. Lewis



Above left: *'The Fowler 2-6-4T gathered more sedate pace' — No 42374 gets hold of the 07.58 to Marple at London Road on 19 August 1959.* / R. Keeley

Top right: *Extra power for the 'Comet' to Euston on 15 August 1958: Caprotti valve gear Class 5 4-6-0 No 44747 heads Pacific No 46206* Princess Marie Louise. / R. Keeley

Above right: *Class 7P 4-6-0 No 46169* The Boy Scout *pulls out of London Road with the 10.20 to Bournemouth on 29 May 1948.*/ A. Pearson

powerful, yet retain considerable grace and elegance. Strength was further emphasised by a very plain smokebox door giving them quite a burly front end. The retention of the continuous splasher over the driving wheels, below which was a deep running plate with cutout access sections, produced a unique appearance for a very large 4-6-0. In my innocence I saw them as the most powerful locomotives working into London Road.

But 'Stanierisation' was well under way on the LMS. By 1936/7 the availability of Pacifics for the West Coast main line meant that most of the elite trains out of London Road could, in the main, be hauled by 'Scots' or 'Patriots'. When this happened the remaining 'Claughtons' and other smaller North Western passenger engines were relegated to secondary duties. They would soon be ousted completely by the legions of new Class 5 4-6-0s.

The power of the 'Claughtons' was sometimes put to good use on parcels and empty stock working. I remember one day at Longsight coming across No 5900 *Sir Gilbert Claughton* on the longest train of bogie vehicles I had ever seen on the main line, 22 empties in all. She was moving slowly and sedately — but then they looked magnificent at any speed. She seemed halfway to Slade Junction before the last coach passed by. Longsight was the heart supplying the life-blood to London Road from its locomotive depot and carriage sheds. The station in my memory is an inextricable mixture of dank subways, grim red brick and vivid pictures of great express trains.

Did I say that the 'Claughtons' were my favourite? Ah, well — that was before I walked to the other end of London Road and dropped down on to Platform B, there to be confronted by one of the 'Sir Sam Fay' 4-6-0s on a Cleethorpes train. I shrivelled a little, feeling a few pangs of conscience for the superlatives I had heaped on the red machine, then bowed in homage to the largest and most impressive inside-cylinder 4-6-0 ever to run in Britain. The 'Sam Fays' (LNER

Class B2) in apple green looked magnificent. Visually they had everything; great bulk to suggest power, long high-pitched boiler and small mountings, overall driving wheel splashers into which the boiler fitted snugly — not too high or too low.

The mid-1930s may well have seen the elite North Western engines relegated to second division work from London Road, but on the LNER side Great Central engines were still holding on to some of the best trains. A few of these left from Central — the Liverpool-Hulls, for example — and on these the Great Central look dominated. Out of Marylebone the 3.20pm down Manchester was in 1936/7 regularly worked by 'Directors'. This was at a time when probably no other crack long-distance trains were still being hauled by a basically pre-1914 type of inside-cylinder 4-4-0, little changed from its original form.

Had London Road been the terminal for only one of its two main railways it would still have captured the observer. Two such varied railways became a guarantee that interest would be constant and considerable whatever time of day you chose. This was particularly marked in the operation of local services, where large modern LMS 2-6-4 tanks contrasted with the little Great Central 2-4-2s.

The diminutive Great Central tanks (LNER Class F1), of a design dating back to 1889, were still in 1930 the mainstay of suburban services to Glossop, Hayfield, Marple and Macclesfield. However, it was a situation that could not last much longer; age was beginning to tell and soon they were to be replaced by the still comparatively small 4-4-2 tanks of Class C13. This Great Central monopoly of local services out of London Road would continue for a further 20 years.

The remarkable thing about the F1s was their power of acceleration and the vigour with which they were driven by the Gorton drivers. Elderly they may have been, but unlike the old soldier their ending was more akin to a triumphant fanfare than a fading away. On more than one occasion I have left London Road behind one with a load roughly equal to that being started by the big Fowler 2-6-4T a couple of tracks away. The F1 quickly snorted into a gallop on its veteran six-wheelers, whereas the 2-6-4, its exhaust much softer, gathered more sedate pace on its modern bogie stock. Time and again we would be swaying round Ardwick curve in a swirl of pungent steam and smoke, leaving the nose of the 2-6-4 some way beyond the tail of our last coach.

'Scots', 'Claughtons', 'Georges', 'Prince of Wales', 'Precursor' tanks, 'Directors', Atlantics and 'Sandringhams' — it was a continuous feast: like having a Shildon 75 every day instead of once in a lifetime. How did it all compare with 1957-9, when I was once more frequenting Manchester?

The late 1950s come out of the comparison pretty well. The great trains were still with us, 'Comet', 'Lancastrian', 'Mancunian', 'Pines', the Marylebones, etc, though the locomotive styles had changed a little. Dmus were making inroads into the local services, but the rush hour-periods still generated much interest. The most noticeable change lay in the types of traction on the Eastern and Midland sides of the station. The LNW train shed was not completely devoid of any sort of North Western passenger motive power. Suburban work was handled, in the main, by arguably the most outstanding fleets of modern passenger tank engines ever seen in the country, the Stanier and Fowler 2-6-4Ts, and the expresses by LMS and BR standard classes. But on the Eastern side express passenger work had been handed over to electric locomotives. Yet in contrast the local passenger work, at least up to the mid-1950s, was still largely entrusted to those now incredibly ancient C13 4-4-2 tanks. Even when these were replaced, the Great Central flag continued to fly, for among their successors were a few of the Great Central 4-6-2 tanks, themselves quite antique, having been built before 1914. There were also a few Thompson 2-6-4 tanks of Class L1; and by strange irony, some of the Fowler 2-6-4s had been drafted in to fill the gap. The A5 4-6-2s were lovely engines, real aristocrats, exuding the Robinson breeding in every line and curve. They were the last pre-group, pre-1914 passenger locomotives to be seen regularly in the station.

At the ex-LMS platforms on most days it was possible to see examples of every type of LMS express engine, plus of course the 'Britannia' Pacifics. LMS Pacifics now worked in regularly, too — in fact, in the earlier years of the decade, before the Manchester/Sheffield electrification was completed, there was the change of seeing both Gresley and Stanier Pacifics in the same train shed. *Flying Scotsman*, then numbered 60103, worked for a time on the Great Central section: in fact I recall one occasion when Scotsman and one of the earlier 'Princess Royals' rested together at adjacent buffer stops.

Steam disappeared, yet there was some compensation for the enthusiast who loved railways, for out of the ashes arose a jewel which is the modern Piccadilly. The early 1960s, which saw the destruction of so many priceless landmarks, were also witness to a few miracles; only a mind of rare quality could have conceived new Piccadilly, the perfect mingling of old and new. Strolling the platforms in sunshine one can marvel at the slender tracery made by the interlacing of delicate ironwork which support the archings of glass roof. Twenty years ago it was concealed, like the ornamentation on many of the city's other Victorian public buildings. Now restored, the train shed at last can reveal its real beauty.

'A perfect mingling of old and new'

Manchester Piccadilly and its modern traction

Right: *Diesel No 45.049 pulls out with the now deceased 18.06 to St Pancras, passing electric locomotive No 86.208 at the platform with the 18.10 to Euston on 16 August 1975.* / D. Griffiths

Below: *A rake of MkIII coaches for a Euston service is brought into Platform 5 by 25kV ac electric locomotive No 85.013 on 4 June 1976.* / P. J. Howard

Below right: *From the ex-LNER side of the station a 1.5kV dc Class 506 emu sets out on the 12.15 service to Hadfield.* / M. Macdonald

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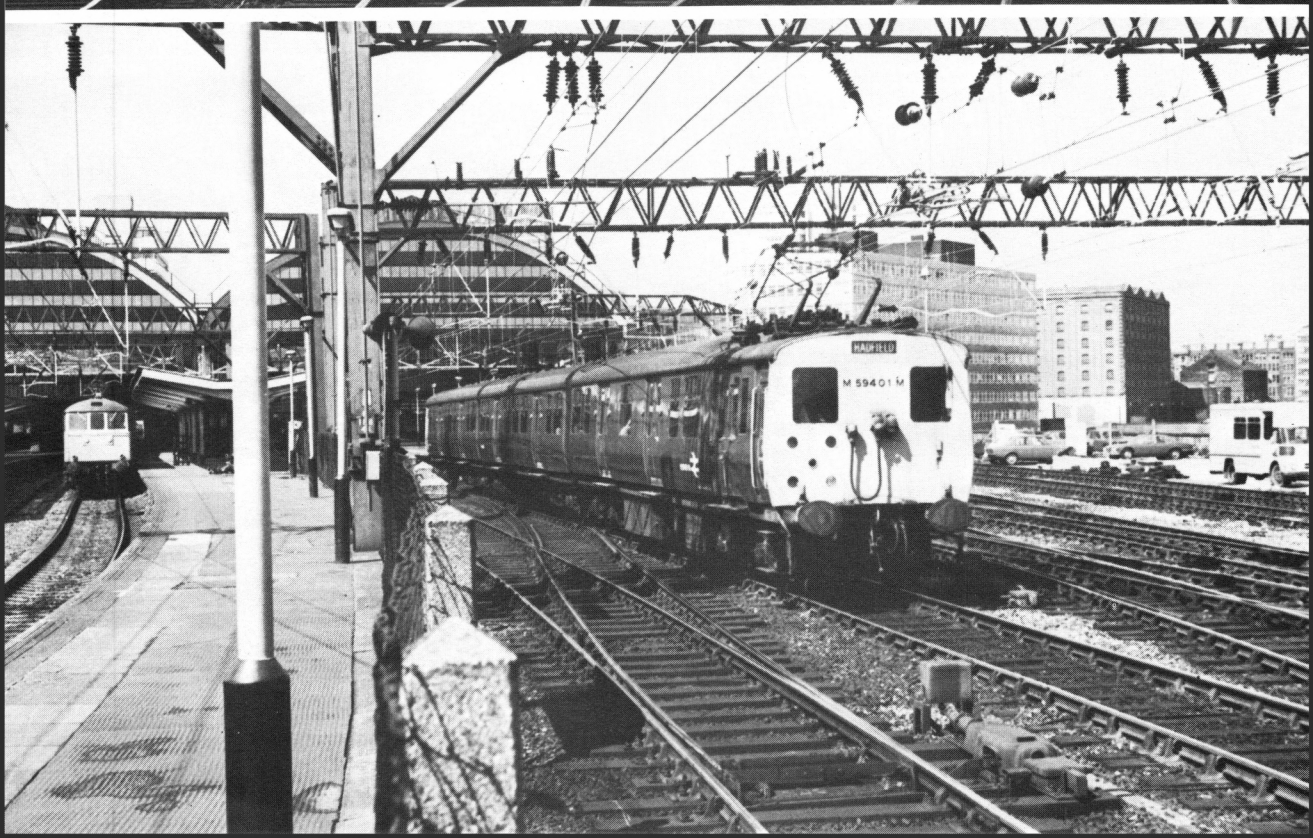
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Below: *The 15.15 Harwich Parkeston Quay boat train, successor to the oldtime 'North Country Continental', awaits departure on 21 May 1977 behind Class 40 diesel No 40.109.* / D. Griffiths

Bottom: *General view of the station on 4 June 1976 as a Gloucester RCW dmu leaves Platform 6 on the 09.05 run to Buxton, while on the left passengers are disgorged by an incoming Class 304/2 emu.* / P. J. Howard

The best of British coaches

An unashamedly personal choice by the Editor of 'Railway World'

MICHAEL HARRIS

Nowadays British Rail has no difficulty in portraying its standard of passenger stock, for the Inter-City image has been successfully implanted in most people's consciousness. Mind you, the picture in the TV commercial or quality press of the dining car conductor's customary deference to a well-dressed Mr or Mrs Average seated in their MkII/III coach wears rather thin south of the Thames! Even so, such was the variety of rolling stock twenty or more years ago that it would have been difficult to say just what was the typical coach interior. Different vintages of vehicle could be sampled and to steer the intending connoisseur to the best of what was available would have required a guide which combined Sir Nikolaus Pevsner's analytical approach to architecture with *Which?* magazine or the gourmet's handbook of your choice.

Inevitably, any guide of this kind is a matter of personal choice, but recognising however that there is a level at which everyone can sink their differences in popular acclaim. So it will be with this consumer's survey: a ramble through the gangways and aisles of old favourites. Fortunately some of the more distinguished coaches are still earning revenue for one operator or another.

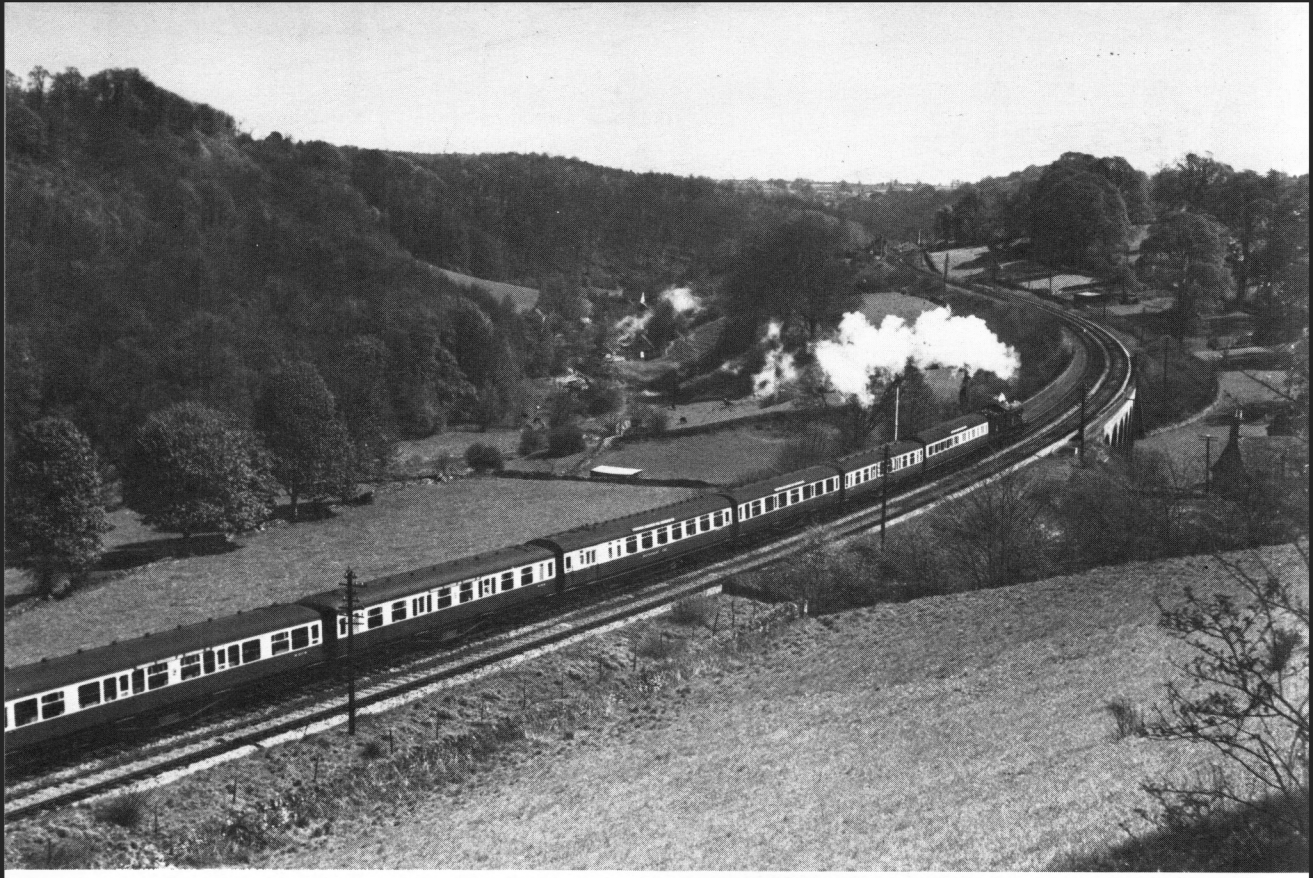
The Western Region could offer some real 24-carat examples. The 'Super Saloons' of 1931 were really exclusive. Except for use on the rather rare Plymouth boat trains, the Members Only Newbury Racecourse specials or VIP trips, they were kept in their stables at Old Oak Common like thoroughbreds. Their very shape was distinctive and reminiscent of a high-class yacht; inside, the figured walnut panels and throne-like armchairs stood comparison with any boardroom. Yes, the 'Super Saloons' were 'rosette' quality rather than a five-star rating and fortunately enough of them are still around to admire.

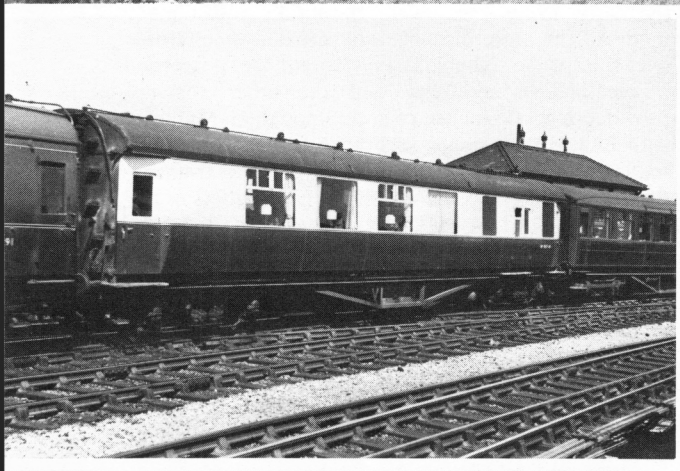
Even into the first two years of the 1960s some reminders of the pre-1914 GWR still lent grace to Paddington's operations. Particular favourites were the 70ft diners of 1907, such as No 9540, which despite 1930s modernisation looked especially well in the short formation of the 13.15 Paddington-Bristol; a real 'diner', in contrast to today's appropriated coaches. Equally, the 70ft 'Cunard' first brakes added special distinction to Newbury Race Course specials at the time. As for later stock, the 1935 'Centenary' were simply, but attractively, finished internally with quartered oak and mahogany panels and looked most dignified. Sadly, by the late 1950s, it was a matter of luck to find them as they had been dispersed to excursion and local sets.

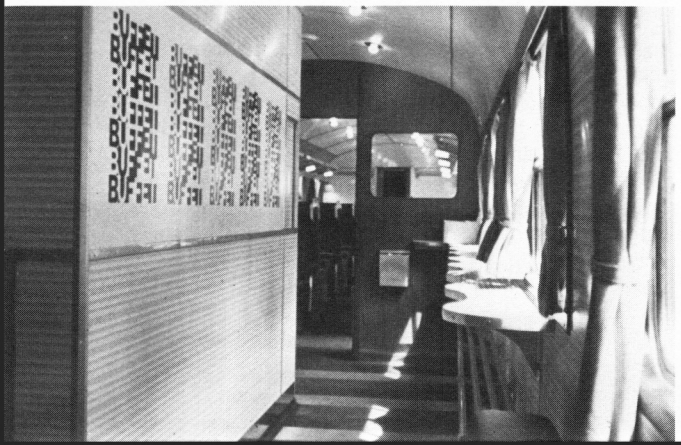
The most felicitous catering cars were probably the 'Quick Lunch Bar Cars' of 1934. No 9631 was preserved by BR and later passed on loan to the Severn Valley Railway. It now belongs to that exclusive fleet of historic vehicles cleared for main-line running. The main feature of Nos 9631/2 was that they were real bar cars; the substantial bar with proper bar stools ran the length of the car. They were especially suited to excursion use and one remembers with fondness their appearance on workings such as an excursion to the Festiniog's AGM in the late 1950s. Somehow recent rolling stock design has never got to grips with the psychology of those seeking refreshment on a train. In particular, the ghastly, antiseptic 'booth cars' of 1968 missed the point entirely.

Venturing south of the river, Waterloo's really top-notch rolling stock could be found on the Bournemouth line in the shape of the handsome Bulleid six-car sets numbered upwards from 290. Until the early 1960s these were beautifully maintained, made all the more distinctive by the bodyside fairing over the coach solebars. The restaurant cars possessed a comfortable simplicity and the other coaches provided a good balance of accommodation. Matched with Bulleid three-coach sets those six-car formations made up probably the smartest steam-hauled trains in the 1950s. No one could call the Bognor buffets of the Maunsell-Bulleid 4-BUF sets attractive, but the Moorish/Odeon style interiors at least signified that eating on a train required a special environment. 'Special' was surely an understatement with which to qualify Bulleid's Tavern cars. The olde-worlde nonsense of the 'Jolly Tar' and his colleagues was, in fact, twenty years before the times; more recently, steak bar chains have made fortunes by indulging in this sort of decor. At least the Tavern cars were fun, an attribute possessed by very few modern vehicles.

For modern Southern vehicles, then, hindsight suggests that they deserved a higher number of stars than many would have considered at the time. The modern SR scene is entirely cheerless (except for 'The Night Ferry') and nothing could be more banal than the 'Buffet' graphics which cover the bar/kitchen partition of a 4-BIG unit. Until the early 1960s the Southern traveller had the choice of some other entertaining vehicles, mostly of pre-grouping design. It







Top left: *The stateliness of an ex-GWR 70ft diner is shown to advantage in this 1954 shot of the 11.30 Cheltenham-Paddington climbing Sapperton bank behind 4-6-0 No 5042* Winchester Castle. / G. F. Heiron

Far centre left: *The GWR 'Super Saloons' were seldom found in ordinary service trains, but on 10 August 1963 No 9117 was marshalled in the 15.00 Birmingham-Paddington.* / P. Kingston

Far bottom left: *Nothing is more banal than the 'Buffet' graphics covering the bar/kitchen partition of an SR 4BIG emu.* / J. A. Upton Woods

Bottom left: *The restrained and dignified modernity of a GWR 'Centenary' first-class diner.*

Above: *'Probably the smartest steam-hauled trains of the 1950s' — a description still merited in 1961 by the 11.30 Waterloo-Bournemouth, of which the leading six vehicles are Bulleid set No 299; it is leaving Southampton Central on 6 March 1961 behind Class WC Pacific No 34098* Templecombe. / J. C. Haydon

Below: *One of the charming ex-SECR push-pull sets, including a coupé first compartment in the leading composite: the train is a Tonbridge push-pull powered by Class H 0-4-4T No 31263 at Oxted on 4 June 1960.* / G. M. Kichenside

is easy to recall with pleasure the ex-SECR composites found in push-pull sets and, particularly, their first-class coupés. Upholstery was still Southern green 'birds and flowers' tapestry and the first-class armchairs were splendid. At the other end of the system, travel around the Exmouth / Sidmouth / Sidmouth Junction lines was all the more idyllic in that LSW lavatory compo sets were still extant in the 1956/7 period.

Other suburban specialities included the non-descript boat brakes of Maunsell's days. These coaches, Nos 4431-50, had two saloons providing a comfortably intimate space with very adequate armchairs to one side of the gangway. The Kent & East Sussex Railway uses a boat brake for wine and dine specials. Recently riding — and dining — in it was a reminder of just how agreeable these coaches were. Even so, it was cheeky of the SR to charge supplements for riding in ageing Maunsell coaches to the Channel ports in the late 1950s, although the 'Folkestone' stock firsts did have rather good two-a-side seating.

Returning north of the Thames it is difficult to be specific about LMS stock. The general run was unremarkable but sound: the twin sliding doors in Stanier (and later) side-corridor stock and the sensible padding at head and cheek levels (making cat-naps on night trains really comfortable) were good features. The peculiar folding-down washbasins certainly were not, the user often being enveloped in steam! The Midland-style open thirds of the mid-to-late 1920s/early 1930s always seemed a cut above the more modern types, whether with two windows to each bay or with the one large window layout. In these days of vandalised suburban electric trains the connoisseur looks back to the LNWR Oerlikon units rather wistfully. These old trains had good variety in seating and a solid and generally comfortable gait. Indeed, looking back at older types of coaches, the standard of riding makes an interesting subject. Many vehicles may not have ridden particularly well, but the buoyancy of their progress was frequently more pleasant than the steady but hard ride characteristic of BR MksII/III.

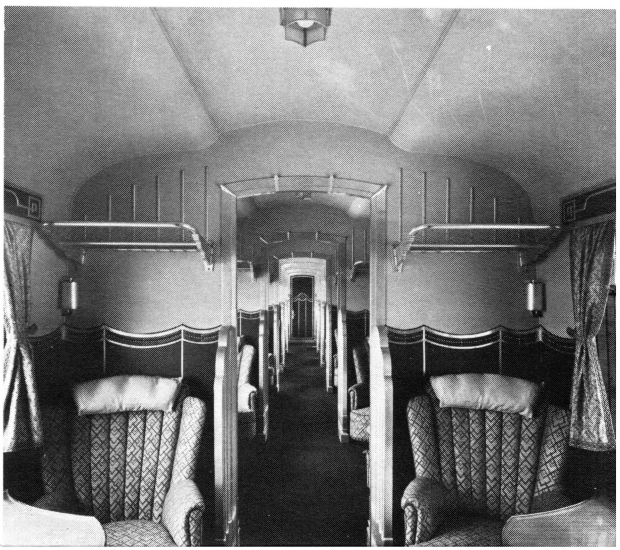
LNER stock is awkward to rate. The interiors of standard stock generally seemed off-putting. There was too much cream paint and bakelite and a certain crudeness of finish. In addition, there was the LNER 'smell' rather like that of old offices. The saving grace was the riding, which was often superlatively steady. The standard open stock, with its one large saloon and solid, sensible seats, was so much better than the side-corridor vehicles. Some of the 1930s fittings were nicely restrained, such as the detail on the saloon doors and the floor-to-ceiling fairings amidships. A good word must be said about the LNER electric multiple-units for Tyneside and the Shenfield services. They were workmanlike and the general plan was spacious.

Finally, one comes to the special stock. The Gresley buffets have survived so recently that they are well-known; the 1960s renovation of their interiors suggested that much more could have been done in similar vein to older stock. The 1938 'Hook Continental' always seemed to be one of the most impressive set trains. In these days of fierce bidding for Wagons-Lits stock of the period it's sad that the 'Hook' set should be beyond recall; with imagination it could have been used for an English version of the 'Nostalgic Orient' cruise train. The 'Coronation' stock, like the GWR specials, was 24-carat quality. At this distance in time the detailed decor which tended to be dismissed as fussy in the 1950s appears as a fine flowering of Art Deco. After rebuilding by BR the Coronation beaver-tail cars were good value and continued to ride beautifully; it's a pity one has not yet been restored for main-line steam runs.

Of BR vehicles there is little to say about the MkI stock — not because it is fashionable to dismiss it as deficient, but because the very style, 'Festival of Britain', was colourless. The catering vehicles, particularly, were often of 'ghastly-good' design and just failed to set a recognisable style. Two exceptions were the 1960 Griddle Cars (of which No 1100 has passed to the National Railway Museum) and the first-class lounge car conversions 14901-3. The latter were rather inspired, even if the conversion consisted of little more than making one saloon out of three compartments. The secret seemed to be in having the seats nearer the ground so that one didn't need to cross and recross legs to stay comfortable. The 1960 Pullman cars were reasonably good in setting a certain ambience of good living but not helped, however, by fussy table lamps. Other essays in Pullman interiors, including both the Blue Pullmans and 1965 Manchester cars, were competent but not inspiring.

So we come to the present day. It is hard not to be critical. Taken individually, the interiors of MkII and III coaches are pleasantly contemporaneous, but fail to suggest that rail is straining to compete with other modes. Given that the Mark III stock is designed for half-term refurbishing, a little more zest in concept, even at the risk of dating slightly, could have been afforded. Much more thought needs to be given to using spaces and colour more effectively: in both cases remedies can be fairly cheap. The best of the more recent vehicles were the side-corridor MkIIa/b firsts, which made good use of materials and mirrors to give a convincingly executive look.

Our short consumer's guide of largely departed vehicles reveals something relevant for today. Unwittingly or not, the coaches had style (granted, it was sometimes bad). More recently the trend has been to go for an international, not railway, style, which is assumed to reflect the environment of modern planes and hotels. But it might be worth asking whether this is desirable. Television plays and sketches usually depict interiors of coaches in the style of the 1930s or 1950s. Perhaps this is the secret: people expect trains to look like trains. The designers should think again.



Far bottom left: *A missed opportunity: had the LNER 'Hook Continental' stock of 1938 lasted until today no doubt its Art Deco furnishing would have been treasured.*

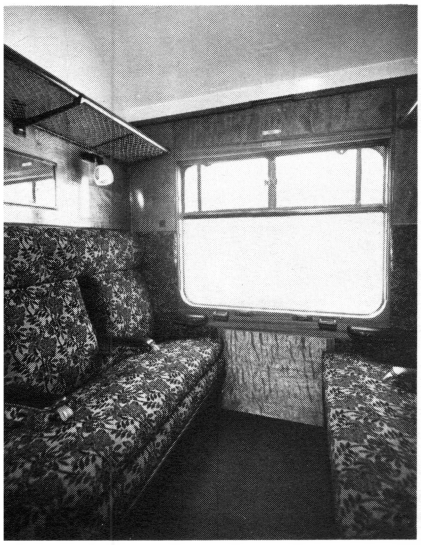
Right: *At least it is still possible to see an ex-LMS London suburban Oerlikon set as one has been preserved: this six-car set on a Watford-Broad Street service is passing under the Metropolitan line at Northwick Park.* / G. M. Kichenside

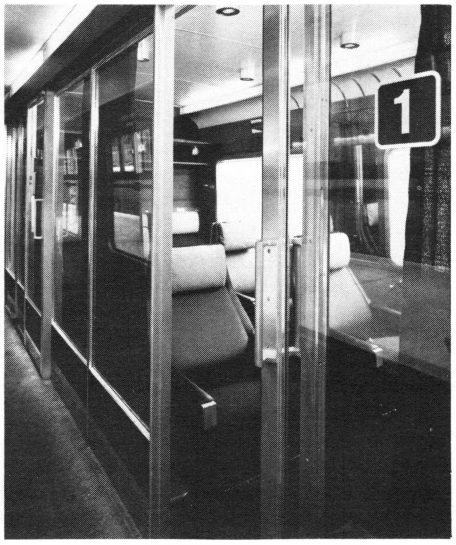
Below left: *The unremarkable but comfortable interior of a Stanier era side-corridor LM coach (in this case an early post-World War II vehicle).*

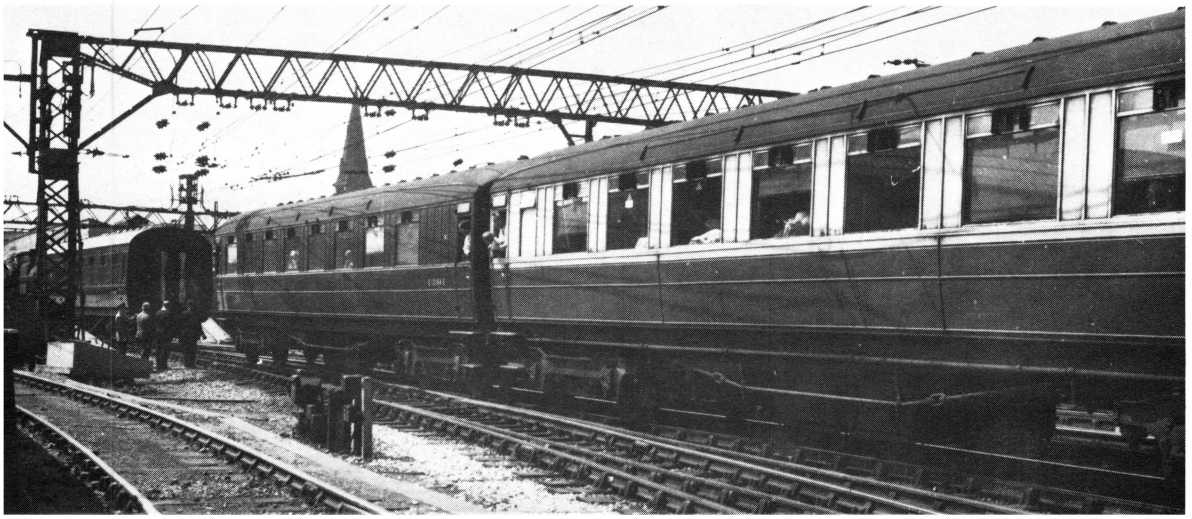
Below centre: *The 1967 Lounge Car rebuilds of BR Mk I firsts showed more imagination than a great deal of other BR stock.*

Below right: *Mk II corridor firsts are probably the best of most recent BR stock, with their careful use of materials and surface finishes and a suitably 'executive' style.*

Bottom: *The LNER open standard stock, such as these two seconds being added to a train at Guide Bridge, had handsome lines and 'solid, sensible' seats.* / G. R. Parkes







Twilight at Bristol Temple Meads: Class 52 diesel-hydraulic No D1051 Western Ambassador *awaits departure to Paddington in January 1965.* / G. F. Heiron

ISBN 0 7110 0861 2
Code ABX/0878